HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

PROJECT MANUAL AND SPECIFICATIONS
November 11, 2025



REGISTERED ARCHITECT
WILLIAM BERGER
19288
STATE OF TEXAS

11/11/2025

Rawley McCoy & Associates
ARCHITECTS AND INTERIOR DESIGNERS

NEXT UP
CALALLEN ISD
PROMOTING EXCELLENCE • CREATING THE FUTURE

RMA PROJECT NUMBER 1092-0325

SECTION 00 01 01 - TITLE PAGE

High School Stadium Improvements - Two

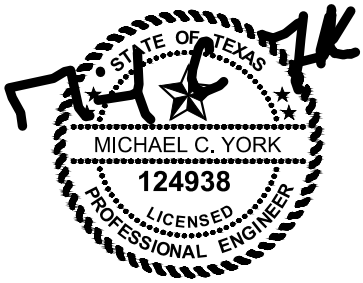
OWNER:
Calallen Independent School District

ARCHITECT:
Rawley McCoy & Associates, PLLC
Architects and Interior Designers
1908 N. Laurent, Suite 540
Victoria, Texas 77901
Phone (361) 573-1642



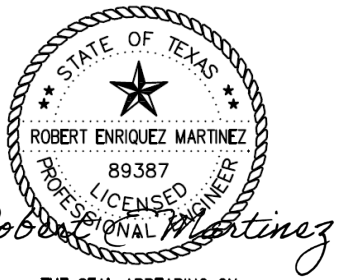
11/11/2025

CIVIL ENGINEER:
York Engineering
9708 SPID, Ste A200.
Corpus Christi, Texas 78404
Phone (361) 245-9400



11 NOVEMBER 2025

STRUCTURAL ENGINEER:
REM Engineering
2218 Basse Rd.
San Antonio, Texas 78213
Phone (2103) 320-1199



11/11/25

THE SEAL APPEARING ON
THIS DOCUMENT WAS AUTHORIZED
BY ROBERT E. MARTINEZ, P.E. # 89387
T.B.P.E. FIRM NO. 6944

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342 S. Navigation Blvd.
Corpus Christi, Texas 78405
Phone (361) 883-9199



11/11/2025

F-6328

MECHANICAL ENGINEER:

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RFCSP - PUBLIC NOTICE

Competitive Sealed Proposals for **"High School Stadium Improvements Two"** for Calallen Independent School District, Corpus Christi, Texas, will be received by the Calallen Independent School District, Emily Lorenz – Superintendent of Schools, Calallen Administration Building, at 4205 Wildcat Drive, Corpus Christi, Texas 78410 on **Monday, December 1, 2025, at 2:00 p.m.**

On site visits to the High School Stadium by vendors may be arranged by contacting Blair McDavid via email at bmcdavid@calallen.org. Visits will be coordinated during regular school hours from the date of release through the indicated due date and time.

Project consists of the construction of a new press box, additions and renovations to the existing restroom facilities, new home and visitor stadium entrances, and new perimeter security fencing as indicated on drawings and specifications.

Electronic Proposal Documents are available from the Architects' Office by request and the CISD website at https://www.calallen.org/departments/business-office/purchasing-procurement All offerors shall register with the Architect's office with request emailed to Karen Pantel, karen@rmaarch.com to be notified of any addendums and clarifications as necessary. Offerors that do not register with the Architects office will be responsible for checking download links regularly for any updates as applicable.

Office of the Architect: Rawley McCoy & Associates, PLLC.; 311 E. Constitution St., Suite 210, Victoria, Texas 77901, Telephone 361-573-1642.

REQUEST FOR COMPETITIVE SEALED PROPOSALS (RFCSP)
FOR
HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

NOTICE AND INSTRUCTIONS TO RESPONDENTS:

Calallen Independent School District herein referred to as 'the District" is a tax-exempt educational organization which is located in northwest Corpus Christi, Texas. The District has approximately 4,000 students and operates two elementary schools, two intermediate schools, a middle school, and a high school. The school's board is composed of seven active members. The District receives funding from local, state, and federal sources, including taxpayer dollars, the Texas Education Agency (TEA), and the U.S. Department of Education (USDE).

Using the Request for Competitive Sealed Proposals (RFCSP) method of procurement under Texas Government Code Chapter 2269, Subchapter D, the District is soliciting proposals from qualified vendors to provide new and renovation construction work for the High School Stadium Improvements as indicated on drawings and specifications.

The RFCSP is to be received at the time and location designated and should include all the information requested hereafter. Failure to comply with the requirements contained in this RFCSP may result in a finding that the respondent and proposal is not qualified. The District reserves the right to exclude from consideration any responses that are incomplete or received after the deadline. All times included in this RFCSP are Central Standard Time (CST).

All solicitations are posted to the District's website, and upon request, will be made available to anyone who wishes to submit a response. However, it is the responsibly of the Respondent to provide the District with appropriate company name, authorized representatives, and contact information for the purposes of receiving notices, changes, addenda, or other critical information. Otherwise, potential respondents are responsible for watching for such notifications.

The District may choose to award to a single Respondent, or multiple Respondents. The District makes no guarantee that an award will be made as a result of this RFCSP or any subsequent RFCSP's and reserves the right to accept or reject any or all submittals, waive any formalities, irregularities, or minor technical inconsistencies, or delete any item/requirement form the RFCSP or contract when deemed to be in the District's best interest.

No contract or award shall be executed until it has been reviewed and approved by the School Board in a duly called and posted meeting of the Board. This RFCSP does not commit the District to pay for any costs incurred prior to the execution of the contract and issuance of the District Purchase Order.

The District reserves the right to accept or reject any and all Respondents, request additional information from Respondents, extend the deadline for submission, and cancel and reissue to RFCSP.

The vendor SHALL NOT contact in any manner, nor deliver gifts or other items, to any District employee (other than the point of contact listed herein for questions and submissions), School Board member, or District consultant during this proposal solicitation, evaluation, and award process without prior approval of the Director of Operations. This restriction extends to "thank you" letters, phone calls, emails and any contact that results in the direct or indirect discussion of the CSP and/or Proposal submitted by Respondents. Failure to comply will result in disqualification.

RFCSP ACTIVITIES:

Issue & Advertise RFCSP – Advertisement #1: Tuesday, November 11, 2025
This is the date of the first procurement advertisement in the Corpus Christi Caller Times newspaper, posted to the district website, and initial distribution of RFCSP packet to vendor list.

Advertisement #2: Tuesday, November 18, 2025
This is the date of the second procurement advertisement in the Corpus Christi Caller Times newspaper.

Deadline for Technical
Assistance Questions: Thursday November 27, 2025 at 12:00 Noon
This is time and date that any technical questions must be submitted by to the District and Architect.

Deadline for Sealed Proposals: Monday, December 1, 2025 at 2:00 pm
This is the time and date that the District's staff will receive, publicly open, and read aloud the names of the Respondents and all fees and prices stated in the Proposals at the District's administration address: 4205 Wildcat Drive Corpus Christi, TX 78410.

ON SITE WALK-THROUGHS:

On site visits to the High School Stadium by vendors may be arranged by contacting Blair McDavid via email at bmcdavid@calallen.org . Visits will be coordinated during regular school hours from the date of release through the indicated due date and time.

TECHNICAL ASSISTANCE AND REQUESTS FOR CLARIFICATION / INTERPRETATION:

Vendors must submit questions regarding this procurement in writing via the following point of contact: Architect's office with request e-mailed to Karen Pantel karen@rmaarch.com, (361) 573-1642. The deadline for submitting questions is Thursday, November 27, 2025 at 12:00 Noon. The questions and answers will be made available to all vendors that will be provided in an email response from the Architect prior to the submittal deadline. Any clarifications or interpretations of this RFCSP that materially affects or changes its requirements will be issued by the Architect as an addendum. It is the responsibility of each Respondent to obtain this information in a timely manner. All such addenda issued by the Architect before the Proposals are due are part of the RFP, and Respondents shall acknowledge receipt of each addendum. The Architect will consider only those clarifications and interpretations that Respondents timely submit prior to the submittal deadline. Interpretations or clarifications in any other form, including oral statements, will not be binding on the District and should not be relied on in preparing Proposals.

PROPOSAL SUBMITTAL REQUIREMENTS:

Responses must be **delivered** to:

Calallen ISD
Attention: Emily Lorenz
Superintendent of Schools
Calallen ISD Administrant Building
4205 Wildcat Dr.
Corpus Christi, TX 78410

Proposal envelopes must be plainly marked on the outside with the Respondent's name and address and the following:

SEALED PROPOSAL - DO NOT OPEN
CALALLEN ISD –HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

The District will not accept responses by oral communication, telephone, electronic mail, telegraphic transmission, fax transmission, or other electronic means. Respondents who hand deliver or mail their proposals, and also provide an electronic copy to any District contact will be disqualified.

Following the deadline for receipt, the District's staff will receive, publicly open, and read aloud the names of the Respondents and all fees and prices stated in the Proposals at the District's administration address: 4205 Wildcat Drive Corpus Christi, TX 78410. Within forty-five (45) days following the date of the opening, District staff will evaluate and rank each Proposal submitted in relation to the selection criteria set forth herein.

Respondents are solely responsible for the timely delivery of their proposal response based on the instructions in this RFCSP. Responses received after the deadline will be rejected and shall be returned to the Respondent(s) unopened. No provisions or exceptions are made for late delivery due to actions or consequences of third-party carriers. The District is not responsible for notifying Respondents of receipt of proposals delivered by third-party carriers.

A complete response will consist of One (1) clearly marked original containing original signatures, Five (5) clearly marked exact copies using standard letter size paper (8.5" x 11") and one digital copy of USB flash media drive. Your proposal must be delivered in a **sealed envelope plainly marked with the RFCSP Title above**. The 'original' response shall prevail in the event of a discrepancy between the Respondent's submissions.

Each proposal shall include the following Three (3) items:

A. **Attachment "A": Procurement Proposal Response Packet (all 37 pages)**
B. **Attachment "A1" Contractors supporting documentation**
C. **Proposal/Bid Security "Bid Bond"**

All vendors must utilize the provided Procurement Proposal Response Packet (Attachment A) as means of response to be considered. All pages in the provided packet must be completed and all required signatures present to be considered. Proposals and responses shall be direct, concise, and complete; prepared in a manner that provides a straightforward description of the respondent's ability to meet the requirements set forth in the RFCSP. Emphasis should be on completeness, clarity of content, responsiveness to the requirements, and an understanding of the District's needs. When submitting a proposal, it is required that Respondent s have the necessary professional experience, prior training and applicable professional judgment to perform the activities proposed to supply the services requested by this RFCSP.

PROPOSAL/BID SECURITY "BID BOND":

A certified or cashier's check, or bid/proposal bond acceptable to Owner, in the amount of at least five percent (5%) of the largest amount proposed must accompany each Proposal submitted. Such proposal security is to protect Owner against the withdrawal by the Proposer following the opening of proposals, and to further protect Owner against the failure, neglect or refusal of any Offeror awarded a contract to execute the required Contract and furnish the required Performance and Payment Bonds within ten (10) days after notification of acceptance.

If any Offeror withdraws his proposal(s), after Owner's opening of proposals, he shall forfeit such bid proposal security to Owner as liquidated damages for such default. If any Offeror whose proposal is accepted by Owner fails or refuses to enter into the Contract/Agreement provided for by Owner or fails or refuses to furnish the required Contract and required Performance and Payment Bonds within ten (10) days after notification of such acceptance, he shall forfeit such security to Owner as liquidated damages for such default.

The proposal security of all Offerors, except the three lowest, shall be returned promptly after the tabulation of proposals. All proposal security will be returned at such time as the Construction Contract has been executed by the successful Offeror. However, if Owner fails to accept any proposal within thirty

(30) days after the date scheduled for opening of proposal and an Offeror withdraws their proposal, their security shall also be returned.

SELECTION PROCESS:

In accordance with Education Code 44.031(b) and Government Code 2269.155, in evaluating qualified proposals for contract award, the District will use the Best Value Method to determine the awarded vendor(s). In determining Best Value, the District will consider the following evaluation criteria, which will be evaluated based on the following scale:

WEIGHT	CRITERIA
5%	**Offeror's General Firm Information and Safety Record (Criteria 1.1 to 1.3)**
25%	**Offeror's Experience, Reputation and References (Criteria 2.1 to 2.3)**
5%	**Offeror's Project Personnel and Qualifications (Criteria 3.1 to 3.3)**
5%	**Offeror's Financial Stability (Criteria 4.1 to 4.2)**
50%	**Price Proposal (Criteria 5)**
10%	**Offeror's Proposed Construction Schedule (Criteria 6)**

The district will select the Respondent that submits the proposal that offers the best value for the district based on the selection criteria and weighted values above, and its subsequent ranking evaluation.

Following the ranking of the Proposals based on the published selection criteria and board action to approve the ranking, the District will attempt to negotiate an agreement with the Respondent that offers the best value to the District. If the District is unable to negotiate an agreement with the selected Respondent, the District will, formally and in writing, end negotiations with that Respondent and begin the negotiation process with the next ranked Respondent in the order of selection ranking until a contract is reached or negotiations with all ranked Respondents end. Please note that the Board may choose to delegate authority to the District's Administration to negotiate and/or execute a contract depending on the specific Board action taken.

By submission of their Proposal, the Offeror also agrees to waive all rights to claims against the District "Calallen I.S.D.", or persons authorized by the district, including the Architect, Rawley McCoy & Associates, PLLC. for any damages whatsoever arising from the Owner's or said person's evaluation of the Offeror's proposal and/or qualifications to perform this specific project.

EXAMINATION OF THE CONTRACT DOCUMENTS AND SITE:

Each Offeror, before submitting their Proposal, shall fully examine and acquaint themselves with the Contract Documents and the sites of the proposed Project. Offeror shall make such investigations as they may deem necessary to fully inform themselves of the existing conditions, facilities, difficulties, restrictions, and requirements incident to completion of the Project under the terms of the Contract.

Failure of the Offeror to acquaint themselves adequately with the site and such conditions, facilities, difficulties, restrictions, and requirements will not relieve them of their obligation to perform the entire Contract at the price set forth in this proposal.

ADDENDA:

Changes in or official interpretations of the Contract Documents will be made only by written addenda. Addenda will be issued primarily by e-mail and will be updated to the main project down load link.

Offerors that do not have access to e-mail may make special arrangements with Architect for alternate delivery methods or shall be required to check the download link regularly.

Receipt of all addenda issued by the Architect shall be acknowledged in each Offeror's proposal, and shall constitute a part of the final contract. It is the duty of each Offeror to obtain any and all addenda and failure of any Offeror to receive any addendum will not release them from any obligation under their Proposal. However, if any Offeror fails to receive any addendum, and their offer is otherwise determined by the Owner to provide the best value, the contract may be awarded to them and the changes in the work set out in the addendum will be incorporated into the contract by a change order, with a corresponding adjustment in the contract price to be made as provided in the Conditions of the Contract.

TRENCH AND EXCAVATION:

If the project requires trench excavation which will exceed a depth of five feet, the Contractor will be required to comply with the provisions of the Trench Safety Requirements of the Contract Documents and to include a separate pay item for trench excavation safety protection based upon (I) the number of linear feet of trench excavated, and (ii) the square feet of any shoring used to satisfy any special shoring requirements. In the absence of enclosures of same in Proposal, Contractor will provide all elements necessary to comply with Trench Safety Requirements at the stipulated lump-sum proposal, without additional compensation.

Contractor shall contract "Call Before You Dig" to mark all known underground utilities before the start of **any work.**

EQUIVALENT PRODUCTS:

In order to establish the desired standard of quality or effect, the Specifications make reference to specific brands, trade-names and/or manufacturer of specified systems, methods, materials and/or services. Additionally, where appropriate, manufacturers of equivalent systems or products are listed. These do not require approval prior to opening of Proposals.

Where approval is required prior to receipt of Proposals others desiring to propose "as equals" shall obtain Architects' written permission to do so not later than five (5) days prior to the date scheduled for opening of Proposals. The Architect shall be provided with manufacturer's data, cut sheets, product samples, and other supportive information sufficient to allow the Architect to render a decision. Also included shall be a letter referenced to this specific project stating that the proposed system, method, material or service meets or exceeds that specified. Approved equals shall be identified in writing. The decision of the Architect is absolute and final.

GENERAL TERMS AND CONDITIONS:

Respondents are advised to review the Standard Form of Agreement Between Owner and Contractor where the Basis of Payment is a Stipulated Sum - AIA Documents A101-2017 and A201-2017 as modified by the Owner, (attached as **Appendix 1**). ***Offeror is directed to pay special attention to the terms and conditions in this proposed form of agreement.*** **The terms and conditions in these AIA documents will govern and to the extent there is any conflict between the terms and conditions below and the terms of the** A101-2017 and A201-2017, both as modified by Owner, the AIA form of agreement will govern.

1. **Applicability:**
   a) All items listed under the general terms and conditions apply unless otherwise stated in the specifications.
   b) These conditions are applicable and form a part of the contract documents in each commodity and/or service contract and a part of the terms of each purchase order for commodity and/or service included in the specifications and Proposal forms issued herewith.
2. **Laws, Policies, and Procedures:**
   a) This solicitation shall be governed by the following documents unless an exception is otherwise taken within this solicitation. Some documents are incorporated by reference only, and may not be attached as part of this solicitation, though they will be considered enforced as part of the solicitation.
      - Texas Education Code Section 44.031.
      - Texas Government Code Sections 2253, 2258, 2269
      - CISD Policies, including but not limited to CH(Legal), CH (Local), CV (Legal), CV (Local), CVB (Legal), CVB (Local).
3. **Use of District Documents:**
   a) Proposal responses must be submitted on forms provided by the District. No alteration to the District forms will be permitted, including substitutions, additions, deletions, or interlineations, without written consent of the District.
   b) Reproduction of District documents is permitted, so long as reproduced copies are exactly the same in size, format, and content as forms prepared by the District. Any response submitted in altered form may result in rejection of such response at the option of the District.
4. **Development of Specifications:**
   a) Brands of equal quality or type are acceptable. The District reserves the right to make final decisions as comparable items. Be very certain that items upon which you submit and deliver are equal to items listed. Materials that are determined to be not equal shall be returned to the Respondent transportation charges collect.
   b) Whenever an article or material is defined by describing a proprietary product or by using the name of a manufacturer or brand name, the term “or equal” if not inserted shall be implied. The specified article or material shall be understood as indicating the type, function, minimum standard of design, efficiency, and quality desired and shall not be construed as to exclude other manufactured products of comparable quality, design, and efficiency.
   c) The District reserves the right to purchase additional quantities above that stated at the same unit price unless otherwise specified by the Respondent.
   d) The District reserves the right to modify conditions and specifications by mutual agreement with the selected supplier, both at the time of acceptance of this Proposal offer as so modified and subsequent thereto.
5. **Inspection of Documents:**
   a) Before submitting a response, each Respondent shall thoroughly examine the Proposal documents and project sites (if applicable) to ensure that the equipment and/or services submitted meet the intent of these specifications.
   b) Each Respondent receiving forms prepared by the District is responsible for inspection of District documents for missing or illegible pages, or other indication of incomplete information provided to the Respondent. The failure or neglect of Respondent to receive or examine any contract document, form, instrument, addendum, or document shall in no way relieve Respondent from obligations with respect to his or her response. The submission of a response shall be taken as prima facie evidence of compliance with this section. Receipt of addenda to the Proposal documents by a Respondent must be acknowledged in the response.
   c) The District is not responsible for incomplete response packets.
6. **Withdrawal or Modification or Correction of Submitted Proposal Responses:**
   a) Any response, which has been submitted, may be withdrawn prior to the deadline. A request to withdraw a Proposal response must be in writing and be received by the District prior to the receiving deadline.
   b) No amendment, addendum, or modification shall be accepted after the deadline for submitting a Proposal response to the District. If a change to a response that has been submitted is desired, the

submitted response must be withdrawn and the replacement response submitted prior to the receiving deadline.

c) No Respondent may have more than one Proposal response on file with the District.
d) After the scheduled time for receiving Proposal responses, responses may not be withdrawn for a period of sixty (60) days.
e) Any contract entered into can be modified or rescinded only by a written document signed by both of the parties or their duly authorized agents.
f) Any erasures and/or corrections to Proposals, whether executed prior to or subsequent to the original Proposal submittal shall be authenticated by affixing in the margin immediately opposite the correction and the initials of the agent(s) signing the Proposal response.

7. Proposal Cost:

a) The District shall not be liable for any cost incurred by a Respondent in the preparation or delivery of its response to this request for competitive sealed proposal or for any other cost incurred because of the request for proposal.

8. Proposal Disclosure:

a) The District is a government body subject to the Texas Public Information Act. Responses submitted to the District as a result of this solicitation are subject to release as public information after contracts are executed or the procurement is terminated. In the event a Respondent desires to claim portions of submitted response are exempt from disclosure, it is incumbent upon the Respondent to identify those portions in a transmittal letter. The transmittal letter must identify the page, the particular exemption(s) from disclosure, and the contended justification for exemption upon which it is making its claim. The District will consider a Respondent's request(s) for exemption from disclosure; however, the District will not be bound by the assertion that a page contains exempt material. An assertion by a Respondent that an entire volume of its response is exempt from disclosure will not be honored.
b) Until a contract resulting from this request for Proposal is executed, no employee, agent, or representative of any Respondent shall make available or discuss its response with the press, any elected or appointed official or officer of the District, or any employee, agent, or other representative of the District, unless specifically allowed to do so in writing by the District for the purposes of clarification, evaluation, and/or awarding the Proposal.
c) Respondents shall not issue any news release(s) or make any statement to the news media pertaining to this request for Proposal or any Proposal and/or contract or work resulting therefrom without the prior written approval of the District and then only in cooperation with the District.
d) By signing this Proposal response, a Respondent affirms he/she has not given, offered to give, nor intends to give at any time hereafter any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a public servant in connection with the Proposal response submitted.
e) Respondent shall note any and all relationships which might be a conflict of interest and include such information with their response.
f) By signing this Proposal response, a Respondent affirms, to the best of his/her knowledge, the response has been arrived at independently, and is submitted without collusion with anyone to obtain information or gain any favoritism that would in any way limit competition or give them an unfair advantage over other Respondents in the award of this Proposal.
g) If a Respondent's response is accepted by the District, the Respondent shall not advertise or publish, without the District's prior consent, the fact the District has entered into the contract, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state, or local government.

9. Delivery and Materials:

a) The Respondent shall store and protect materials and equipment in accordance with the manufacturer's recommendations.
b) The Respondent, in the event of damage, shall immediately make all repairs and replacements necessary to the approval of Calallen ISD, with no additional cost to the District.
c) All deliveries will be made to the address(es) specified on the purchase order during normal working hours of 8:00 a.m. to 4:00 p.m. Monday through Friday, unless authorized by the Purchasing Coordinator or designee.

d) The District shall not be responsible for any “hidden damage” for a period dating from the date of delivery until statute of limitations as provided by the Uniform Commercial Code.
e) If applicable, delivery shall provide, at no cost, at least one copy of any applicable Manufacturer’s Safety Data Sheets (SDS) with each shipment, and upon request. If OSHA, federal, or state laws provide for additional requirements, those requirements are in addition to the SDS requirement.
f) The Respondent shall retain all portable and detachable parts or portions of installation until final completion of work. These parts shall be delivered to the District‘s Representative or designated District site and acknowledged as itemized receipts to obtain request for final payment.

10. Licenses, Permits, and Taxes:

a) The price or prices for the services shall include full compensation for all taxes, permits, and licenses that the Respondent is or may be required to pay.

11. Invoice, Payment, and Inspection:

a) The Respondent shall provide an invoice showing labor hours performed by labor description and the actual invoices for all materials purchased before payment will be issued.
b) The District will pay the Contractor’s actual cost plus the contracted mark up for materials. All items purchased (i.e., tools) and billed to the District will remain the property of the District.
c) Federal excise taxes, state taxes, or sales taxes shall not be included in the invoiced amount. The District is not liable for these taxes. The District will furnish a tax exemption certificate upon request.
d) All valid and complete invoices received by the District will be paid within thirty (30) days of the District’s receipt of the deliverables or of the invoice, whichever is later.
e) Payment terms, including the rate of interest that shall accrue on any overdue payments, are subject to Chapter 2251 of the Texas Government Code.
f) The Respondent shall demonstrate work completed meets the requirements of Galveston ISD.
g) The District Representative shall give final approval to all work performed.
h) The Respondent will email all or fax all inspection reports or other applicable documents to the District Representative for processing.

12. Award of Contract:

a) The District reserves the right to accept or reject, in part or in whole, any and all Proposal responses and to waive any irregularities or informalities in any Proposal or in the Proposal process. The contract will be awarded to a responsible Respondent. Whose responses are most advantageous to the District, considering the relative importance of price and the other evaluation criteria which may be included in the proposal.
b) Award of the contract shall be made to the bidder who provides goods or services at the best value for the District taking into consideration the relative importance of price and other factors set forth below. Best value evaluation criteria will be grouped into percentage factors.
c) The District may, by written notice to contractor, cancel the contract if it is found by the District that gratuities, in the form of entertainment, gifts, or otherwise, were offered or given by contractor or any agent or representative of contractor, to any employee or members of the Board of Trustees with a view toward securing an order or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performing of such order.
d) A Respondent may be disqualified before or after an award is made, upon evidence of collusion with the intent to defraud, or perform other illegal activities for the purpose of obtaining an unfair competitive advantage.
e) It is expected that all contact by Respondent with any District personnel and/or members of the Board of Trustees begin with the issuer of this Proposal. Failure to follow this procedure is grounds for eliminating the Respondent from any further consideration of awarding the contract. The recommendation to award the Proposal will be made to the District Board of Trustees. No contract shall be executed until it has been reviewed and approved by the Board of Trustees in a duly called and posted meeting of the Board.
f) In connection with the performance of work under the contract, the Respondent agrees to comply with the Fair Labor Standard Act, Equal Opportunity Employment Act, and all other applicable federal, state, and local laws, regulations, and executive orders to the extent that the same may be applicable.

13. Insurance:

a) If requested the successful Respondent shall be required to provide the District with copies of certificates of insurance, named as additional insured. Certificates of Insurance, name and address

of Respondent, the limits of liability, the effective dates of each policy and policy number shall be delivered to the District prior to commencement of work. The insurance company shall be licensed in the State of Texas, certificate forms shall be approved by the Texas Department of Insurance and shall be acceptable to the District. All policies of insurance shall waive all rights of subrogation against the District, its officers, employees, and agents.

b) The required insurance coverages and limits are listed in the draft of form agreement provided with this RFCSP.

14. Prevailing Wage Rate:

a) Respondents are required to comply with Texas Government Code, Chapter 2258 Prevailing Wage Rates, with respect to payment of prevailing wage rates for the construction or improvements, paid for in whole or in part from public funds, without regard to whether the work is done under public supervision or direction. A worker is employed on a public work if the worker is employed by the Respondent or any subcontractor in the execution of the contract for the project.

b) A worker employed on a public work by or on behalf of the District shall be paid no less than the general prevailing rate of per diem wages for the work of similar character in the locality in which the work is preformed, and not less than the general prevailing rate of per diem wages for legal holiday and overtime work.

c) The District has adopted the federal Davis-Bacon wage rates for the use in Texas pursuant to and in accordance with the Texas Government Code, Section 2258.022. The District's prevailing wage rate is provided in the vendor packet in **Exhibit A.**

d) The Respondent or subcontractor who violates Texas Government Code Section 2258.023 shall forfeit as a penalty to the District, $60.00 for each worker employed for each calendar day, or portion thereof, such worker is paid less than the stipulated rates for any work done under the contract by him, or by any subcontractor under him.

e) Nothing herein contained, however, shall be construed to prohibit the payment of more than the prevailing rate of wages to any worker employed on the work.

15. Service-Related Contracts:

a) The Respondent warrants it shall have available the necessary personnel, organization, equipment, and facilities to perform all the services and /or provide all the goods required under this solicitation.

b) The Respondent shall employ orderly and competent employees trained in the required services to be provided under this solicitation.

c) The Respondent, its employees, subcontractors, and subcontractor's employees may not use or possess any firearms, intoxicating beverages, tobacco, illegal drugs, or controlled substances while on the District's property, nor may such workers be intoxicated, or under the influence of alcohol or drugs.

d) The District reserves the right to prevent, forbid, and/or temporarily or permanently bar any Respondent, its employees, subcontractors, and subcontractor's employees from any district facility for whatever reason it determines necessary to maintain safety and orderly operations.

e) If applicable under this solicitation, Respondent, its employees, subcontractors, and subcontractor's employees shall have and maintain any and all required licenses and/or certifications for the duration of the contract. Additionally, the District reserves the right to require proof of any such requirement at any time during the contract term.

f) The Respondent, its employees, subcontractors, and subcontractor's employees shall fully comply with all applicable federal, state, and local safety and health laws, ordinances, rules and regulations in the performance of the services, including but not limited to those imposed by the District and by the Occupational Safety and Health Administration (OSHA). In case of conflict, the most stringent safety requirements shall govern.

16. Warranties:

a) Warranty conditions for all supplies and/or equipment shall be considered manufacturer's minimum standard warranty or a minimum of one (1) year guarantee, whichever is greater, unless otherwise agreed to in writing. Respondent shall be an authorized dealer, distributor, or manufacturer for the product. All equipment submitted shall be new unless clearly stated in writing.

b) If a Respondent's response is accepted by the District, the price to be paid by the District shall be that contained in Respondent's response which Respondent warrants to be no higher than Respondent's current prices on orders by others for products of the kind and specification covered

by this agreement for similar quantities under similar or like conditions and methods of purchase. In the event Respondent breaches this warranty, the prices of the items shall be reduced to the Respondent's current prices on orders by others, or in the alternative, the District may cancel this contract without liability to Respondent for breach or Respondent actual expense.

c) If a Respondent's response is accepted by the District, the Respondent warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for commission, percentage, brokerage, or contingent fee excepting bona fide employees of bona fide established commercial or selling agencies maintained by the Respondent for the purpose of securing business. For breach or violation of this warranty, the District shall have the right in addition to any other right or rights to cancel the contract without liability and to deduct from the contract price, or otherwise recover the full amount of such commission percentage, brokerage, or contingent fee.

d) If a Respondent's response is accepted by the District, the Respondent shall not limit or exclude any implied warranties and attempt to do so shall render the contract voidable at the option of the District. Respondent warrants that the goods furnished will conform to the specifications, drawings, and descriptions listed in this request for Proposal, and to the sample(s) furnished by the Respondent, if any. In the event of a conflict between the specifications, drawings, and descriptions, the specification shall govern.

e) If a Respondent's response is accepted by the District, the Respondent warrants the product sold to the District shall conform to the standards promulgated by the U.S. Department of Labor under Occupational Safety and Health Act (OSHA). In the event the product does not conform to OSHA standards, the District may return the product for correction or replacement at the Respondent's expense. In the event the Respondent fails to make the appropriate correction within a reasonable time (15 working days), correction made by the District will be at the Respondent's expense.

17. Indemnification:

a) The Respondent will defend, indemnify, hold harmless, and exempt the District, its officers, agents, and employees from and against any and all suits, actions, legal proceedings, claims, demands, damages, costs, expenses, and attorneys' fees incident to any work done in the performance of this contract arising out of a willful or negligent act or omission of the Respondent, its officers, agents, or employees.

18. Force Majeure:

a) Neither party shall be deemed to have breached any provision of this contract as a result of force majeure. The term force majeure as referenced herein, shall mean acts of God, strikes, lockouts, or other industrial disturbances, act of public enemy, orders of any kind of government of the United States or the State of Texas or any civil or military authority; insurrections; riots; pandemics, epidemics; landslides; land sinkage; lightning; earthquake; fires; hurricanes; storms; floods; washouts; droughts; arrests; restraint of government and people; civil disturbances; explosions; breakage or accidents to machinery, pipelines or canals, or other causes not reasonably within the control of the party claiming such inability.

19. Non-Appropriate Clause:

a) Any/all contracts exceeding one (1) year will require a standard non-appropriation clause. Renewal of contracts will be in accordance with Local Government Code 271.903 concerning non-appropriation of funds for multi-year contracts. The Board of Trustees of District reserves the right to rescind the contract at the end of each fiscal year if it is determined that there are insufficient funds to extend the contract.

20. Uniform Commercial Code:

a) All contracts and agreements between Respondent and the District shall strictly adhere to the statutes as set forth in the Uniform Commercial Code as last amended by the American Law Institute in the National Conference of Commissioners on Uniform State Laws. Reference: Uniform Commercial Code, Official Text.

21. Non-Performance:

a) Immediate non-performance of the Respondent in terms of specifications shall be a basis for the termination of the contract.

b) If, at any time, the Respondent fails to fulfill or abide by the terms, conditions, or specifications of the contract, the District reserves the right to: a) purchase on the open market and charge the

Respondent the difference between contract and actual price, or b) deduct charges from existing invoice totals due at the time.

c) The District shall have the right to cancel for default all or any part of the undelivered portion of this order if Respondent breaches any of the terms hereof including warranties of Respondent or if the Respondent becomes insolvent or commits acts of bankruptcy. Such right of cancellation is in addition to and not in lieu of any other remedies which the District may have in law or equity.

22. Termination of Contract:

a) The District shall have the right to terminate the contract, in whole or in part, for its own convenience and without cause any time upon thirty (30) days prior written Notice of Termination. Upon receipt of a Notice of Termination, the Respondent shall promptly cease all further work pursuant to the contract award, with such exceptions, if any, specified in the Notice of Termination.

b) The District will pay the Respondent, to the extent of funds appropriated or otherwise legally available for such purposes, for all goods delivered and services performed, and obligations incurred prior to the date of termination in accordance with the terms hereof.

23. Venue:

a) This Proposal shall be constructed and enforced in all respects in accordance with the laws of the State of Texas and the laws of the United States applicable to transactions in Texas. Exclusive venue with respect to any legal action relating to or arising under this Proposal shall lie in the District Court(s) of the State of Texas sitting in Galveston County, Texas, Respondent hereby expressly consenting to the jurisdiction of such courts.

SAFETY & SECURITY MEASURES:

Student, instructor and all staff safety and campus security are of the upmost importance to the District, and safety and security measures are required by state law or prescribed for in District policy and procedures. Adherence to the District safety & security measures while on District premises is required. Each campus presents security concerns in terms of site access, traffic, classroom and non-classroom related functions. The work performed at each campus is directive in nature and work rules for each project can vary depending on the scope of work. CISD has responsibilities to the students, staff, the State of Texas and others to ensure that safety measures are strictly applied on each project.

1. Requirements:

a. The Contractor, Subcontractor, their agents, and all others who perform Work on any District campuses are required to observe and abide by the campus security.

b. The Contractor, Subcontractors, and their agents shall perform employee background checks and shall guarantee and manage construction activities to prevent any person with a felony conviction or convictions for crimes of "moral turpitude" from gaining access to school property or entering any school facility.

c. Criminal History Checks: Upon request from the District at any time, the Contractor shall provide a list of employees that is updated on a regular basis and provide the following minimum information for each person working on school property:
   1) Legal Name: First and Last.
   2) Date of Birth.
   3) Last 4 digits of their social security number.
   4) Driver's License State and Number.

d. Contractor Supervisor and Designated Support Personal:
   1) Supervisor shall be present for all activities. If Owner finds out that the supervisor or their designated staff are not in responsible charge of the worksite, Owner may terminate work activities at the Contractors expense until such time the appropriate personnel are back in responsible charge.
   2) Supervisor is responsible for securing the project site each day after work and shall confirm that the site is safe and secure. Check all interior and exterior doors, floor hatches, roof hatches, roof access doors, gates, temporary barricades and the like.
   3) Supervisor is responsible for verifying that the project and site are clean after work each day. All trash is disposed of in approved containers. Floor surfaces are clean. Campus grounds are clear and all holes are covered up.

e. RAPTOR Checks:
    1) All contractor personnel shall obtain a RAPTOR check upon their first day of work on the project. The Contractor is required to obtain a replacement badge if their badge gets damaged or becomes non-legible. All personnel will be issued a paper badge with their name, photo, and date of issue. This badge shall be affixed to a badge clip that shall be affixed to their uniform shirt in the upper torso area and shall be worn at all times.
    2) Contractor shall obtain a new Raptor badge every month around the 1st day of the month regardless of the initial badge issued date. Contractor shall contact the Maintenance Office and schedule the quantity of personnel requiring retesting in advance so as to not overload the maintenance office regular school activities.
f. Owner reserves the right to question all Contractor personnel and to perform additional background checks and safety and security screening as applicable at their discretions for any persons working on school district property.
g. Campus Check-in Procedures:
    1) The Supervisor or designated staff shall check in at the main office of each school campus each workday and shall be responsible for facility access and control direct sub-contractor supervision. Contractor personnel and sub-contractors are not required to check-in to a campus that has a Supervisor in responsible charge.
    2) All employees must check-in at the Maintenance for the 1st day at work and at the 1st of the month.

2. Code of Conduct:

a. All Contractor, Subcontractors, and their agents shall be required to wear company uniforms with company name and logo clearly marked, RAPTOR tags that are currently up to date, and all appropriate and applicable safety gear such as hard hats at all times when on District premises. All attire shall be clean and presentable at the start of work each day.
b. Interaction with students, faculty, and staff is discouraged. The District will not tolerate “cat-calling,” “whistling,” “profanity,” or derogatory remarks.
c. No smoking or tobacco products, illegal drugs or weapons or firearms are allowed on District premises.

SPECIFICATIONS:

- **The Project Manual with plans/specifications/drawings is also provided as Exhibit C.**
- All Plans and Specification have been provided by Rawley McCoy & Associates, PLLC. and incorporated as Exhibit C in this document.
- Where certain manufacturers or products are specified, it is not to limit competition but to set a standard of quality satisfactory to the Owner. All proposed substitutions must be submitted to the Owner prior to the receipt of Proposal and, if approved, must be listed in an addendum issued prior to the Proposal date.

ESTIMATED PROJECT BUDGET:
$6,000,000.00

Owner’s Contingency:
The respondent shall provide for and include an owner’s contingency of $150,000.00. Refer to the Attachment “A” and Specification Section 01 21 00 for further details.

END OF SECTION

CALALLEN ISD **ATTACHMENT "A"**

RFCSP FOR HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

PROCUREMENT PROPOSAL RESPONSE PACKET – *Construction Services ONLY*

Note: All pages must be completed by Proposers and Submitted with Final Proposal.

VENDOR APPLICATION - REQUIRED FORM

Instructions:

1. The application form should be completed and signed by an authorized representative of the vendor.
2. The application must be submitted with all supporting documents and completed certifications.

Notice to Prospective Vendors:

1. Vendors are not placed on the district's approved vendor list until a purchase order is approved by the purchasing department.
2. Vendors must accept purchase orders for all purchases. The district will not be responsible for payment for goods or services that are provided to Calallen ISD staff without an approved purchase order issued.
3. All invoices must reflect the purchase order number and must be emailed or mailed to the Calallen ISD Accounts Payable Department (email address and mailing address are noted below).
4. All payments are net thirty (30) days after receipt of the goods and/or services.

VENDOR IDENTIFICATION:	
Vendor Full Legal Name	
Vendor DBA *(if applicable)*	
Texas Taxpayer ID #	
VENDOR CONTACT INFORMATION:	
Vendor Mailing Address:	
Vendor Remit Address: ***(if different from mailing)***	
Vendor Phone Number:	
Vendor Fax Number:	
Vendor Website URL:	
Vendor Email Address: ***(for point of contact on procurement)***	

I hereby certify that the above information is true and correct. I further certify that I am an authorized representative of this vendor.

_____ _____

Authorized Representative (Print Name) Title

_____ _____

Authorized Representative (Signature) Date

PROPOSAL RESPONSE CERTIFICATION - REQUIRED FORM

The undersigned authorized representative of the responding company indicated below hereby acknowledges:

1. That the respondent is authorized to enter into contractual relationship on behalf of the responding company indicated below.
2. That respondent has carefully examined this document in its entirety.
3. The respondent proposes to supply any products or services submitted under this solicitation in strict compliance with all terms, policies and procedures, unless any exceptions are noted.
4. That any and all exceptions have been noted in writing in the response and that no other exception will be claimed.
5. The accuracy of all certifications required which accompany this proposal.
6. The stated organization is an equal opportunity employer.
7. That any prices in this offer have been determined independently, without consultation, communication, or agreement for the purpose of restricting competition, as to any matter related to such prices, with any other Respondent or with any competitor.
8. That notice of award and/or any communication regarding an award will be submitted via CISD and not by any consultant, Respondent or other party involved in this solicitation.
9. That the organization has not been a party to any collusion among Respondent in restraint of freedom of competition by agreement to offer at a fixed price or to refrain from offering; or with any CISD employee, Board Trustee, or consultant as to quantity, quality, or price in the prospective contract, or in any terms of the prospective contract except in any authorized discussion(s) with CISD's Purchasing personnel; or in any discussions or actions between Respondent and any CISD employee, Board Trustee, or consultant concerning exchange of money or other things of value for special consideration in the award of this contract.
10. That neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
11. By submitting a Proposal, Respondent agrees to waive any claim it has or may have against the District, its trustees, agents and employees, and any reference sources, arising out of or in connection with the administration, evaluation, or recommendation of any Proposal; waiver of any requirements under the Proposal documents; acceptance or rejection of any Proposal; and award of the Proposal. The District shall have no contractual obligation to any Respondent, nor will any Respondent have any property interest or other right in the Proposal or contract being proposed unless and until the contract is unconditionally executed and delivered by all parties, and all conditions to be fulfilled by the Respondent have been fulfilled by the Respondent.

By submitting this proposal, the Respondent warrants that the Respondent has had the opportunity to carefully examine the site of the proposed work and all of the requirements of the RFCSP. The Respondent further warrants that the Respondent is satisfied that there are no conflicts in the bidding documents and that the site proposed for the project is suitable for the work. By submission of a proposal in response to this RFCSP, the Respondent confirms Respondent's understanding of the entire document and all of its contents. The Respondent also represents that its firm possesses the personnel, processes, and technology necessary to safely and efficiently perform the work outlined in this RFCSP.

Your signature below is the Proposal Response Certification acknowledgement.

_____	_____
Authorized Representative (Print Name)	Title
_____	_____
Authorized Representative (Signature)	Date

RESPONDENT'S MONETARY PROPOSAL - REQUIRED FORM

This Proposal is submitted by

_____,

(hereafter called "Proposer"), for the construction of "HIGH SCHOOL STADIUM IMPROVEMENTS -TWO" Calallen I.S.D., Corpus Christi, Texas, (hereafter called "Project").

BASE PROPOSAL: Proposer agrees to furnish for the total sum of

_____

_____Dollars ($_____), all labor, services, materials, tools, equipment and supervision necessary to the full and final completion of the project, and everything incidental thereto, as shown on the Drawings, stated in the Specifications, or properly inferable therefrom, all in accordance with the Contract Documents governing the construction of such project prepared by Rawley McCoy & Associates, PLLC., (hereafter called the "Architect").

Contractor's Base Proposal includes a $150,000.00 Contingency Allowance as required by Specification Section 01 21 00.

In compliance with Article 5 of the General Conditions of the Contract for Construction, we propose to use the following listed subcontractors for work on this project: **Failure to list the subcontractors requested below may be used as cause to reject bid**. If a single subcontractor is not known for sure at time of bid submission, list two or more possible subcontractors under consideration, state no sub bid received (the assumption will be that general contractor has simply estimated the work) or if the general contractor is going to perform the work themselves list general contractor or GC. **Do not leave any lines blank**.

BASE PROPOSAL CONTRACTOR/SUB-CONTRACTOR LIST:

(Company Name)

1. Site Utilities: _____
2. Site Asphalt Placement & Finishing: _____
3. Masonry: _____
4. Concrete Placement & Finishing: _____

5. Structural Steel and Erection: _____
6. Miscellaneous Metals: _____
7. Mechanical: _____
8. Electrical: _____
9. Plumbing: _____
10. Metal Stud Framing & Gypsum Board: _____
11. Thermal Insulation: _____
12. Roofing: _____
13. Metal Wall Panels: _____
14. Steel Doors & Frames: _____
15. Painting & Finishing: _____
16. Flooring: _____

OVERHEAD AND PROFIT FOR CHANGES IN WORK:

For work performed by Contractors own forces:		For work performed by a subcontractor and supervised by Contractor:	
Overhead:	10%	Overhead:	10%
Profit:	5%	Profit:	5%

Overhead and Profit shall include (but not limited to) the following: Supervision, Insurance, Bonds, Workman's Comp, Mark-up, Job-site and Office Overhead, Coordination, Submittals and any other related expenses.

Offeror represents that, prior to preparing this Proposal, they have carefully read the Contract Documents, examined the site of the Project, and had made an investigation such that they are fully informed of the conditions, facilities, difficulties, restrictions and requirements which they will, or may encounter in the completion of the Project in accordance with the terms of the Contract Documents.

Accompanying this Proposal is a certified or cashier's check or proposal/bid bond payable to the order of the Calallen Independent School District, Corpus Christi, Texas (hereafter called "Owner"), for not less than five percent (5%) of the largest amount for which a contract can be awarded under this proposal.

Offeror agrees that if they are awarded the contract they will execute and deliver to Owner, within ten (10) days after they are notified of the acceptance of his proposal, a Contract Agreement for the construction of such Project, plus required project insurance and bonds, in the forms acceptable to the Owner.

Should Offeror fail to execute such contract or furnish such Bonds within the prescribed time, Offeror agrees that the accompanying proposal security shall become the property of the Owner as liquidated Damages for the additional delay and the expense which will be incurred by Owner as a result thereof.

Offeror agrees that if their Proposal is accepted by the Owner, Offeror will Substantially Complete with all work on or before July 31, 2026, and if the work is not completed by such time, Offeror agrees to pay to Owner, as liquidated damages, the sum of Five Hundred ($500.00) for each calendar day after such time that the work remains incomplete, calculated in accordance with the provisions of the Contract Documents.

_____	_____
Authorized Representative (Print Name)	Title
_____	_____
Authorized Representative (Signature)	Date

RESPONDENT'S GENERAL QUESTIONNAIRE - REQUIRED FORM

(With Criteria, Weights, and Methodology)

Instructions: Respondents are required to attach an ATTACHMENT "A1" to their PROCUREMENT PROPOSAL RESPONSE PACKET which addresses all of the following general questionnaire requests.

GENERAL FIRM INFORMATION (CRITERIA 1.1 THRU 1.3) – 5 POINTS TOTAL

General Firm Information: General (Criteria 1.1)

1. Name of Firm, address of principal office, phone, and fax numbers, contact person (with telephone and email address)
2. Type of Business Organization (Corporation, Partnership, etc.)
    a) If your organization is a corporation, state the date of incorporation, the state of incorporation, president's name, vice president's name, secretary's name, and treasurer's name.
    b) If your organization is a partnership, state the date of organization, type of partnership, and names of general partners.
    c) If your organization is individually owned, state the date of organization and the name of the owner.
    d) If your organization is a form other than those listed above, please describe it and name your principals.
    e) Year Founded; state how many years your organization has been in business in its current capacity; list any former names under which your organization has operated.
3. List jurisdictions and trade categories in which your organization is legally qualified to do business and indicate registration or license numbers, if applicable.
4. List jurisdictions in which your organization's partnership or trade name is filed.

General Firm Information: Safety Record (Criteria 1.2 & 1.3)

1. Provide information related to your firm's accident frequency rate for the last five years, including any OSHA citations and deaths that have occurred on your projects. (Submit Form 300)
2. Describe your organization's safety program and provide your workers' compensation experience modification factor. List any safety awards your company has received within the past five (5) years.

EXPERIENCE, REPUTATION AND REFERENCES (CRITERIA 2.1 THRU 2.3) – 25 POINTS TOTAL

Experience, Reputation and References: Comparable Experience (Criteria 2.1)

1. List the categories of work that your organization normally performs with its forces.
2. Would you propose to do any work with your own forces or bid all work to subcontractors?

3. List all construction projects your organization has in progress, giving the name and location of the project, owner, architect, contract amount, percent complete and scheduled completion date.
4. List all construction projects your organization has performed in the last seven years. For each, include the name Owner, the name of the Project, a brief description of the Project, the budget for the Project, whether the Project completed on or before the date contracted for Substantial Completion, and whether the Project completed within the budget amount, and the reason for any additional amounts exceeding the original contract amount.
5. Please list all of your firm's previous experience with the District, including the name of project, and date of substantial completion; list all previous experience any of the proposed personnel have had with the District, including the name of the project and the date of substantial completion.

Experience, Reputation and References: Reputation and References (Criteria 2.2)

1. Within the last five years, has an officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details).
2. Describe your organization's concepts for working in a team relationship with the Owner and Architect during the design and construction of major projects.
3. Describe the most common problem or challenge that you have encountered in construction and your method for addressing the issue. (Maximum length: 2 pages.)
4. What makes your project team unique and most qualified to complete this project? Please answer in essay form.
5. Please describe your firm's ability to complete projects on schedule, including the number of projects that have not been completed on schedule, and the reasons for such delay.

Experience, Reputation and References: Claims/Disputes (Criteria 2.3)

1. Claims and suits: If the answer to any of the questions below is yes, please attach details:
    a. Has your organization ever failed to complete any work awarded to it?
    b. Are there any judgments, claims, arbitration proceedings or suits outstanding against your organization or its officers?
    c. Has your organization filed any lawsuits or requested arbitration with regard to construction contracts within the last five years?

<u>OFFERORS PROJECT PERSONNEL/QUALIFICATIONS (CRITERIA 3.1 THRU 3.3) – TOTAL 5 POINTS</u>

Proposer's Project Personnel and Qualifications: Program Management (Criteria 3.1)

1. Identify your firm's proposed Project Manager and Site Superintendent who will work on the project. Provide a resume and references for each individual.
2. Identify the person who will be primarily responsible for accounting for the Project and describe their qualifications to perform that function.

3. Identify the person who will be primarily responsible for cost estimating for the Project and describe their qualifications.

Proposer's Project Personnel and Qualifications: Succession Planning (Criteria 3.2)

1. Identify your team's key personnel and process for replacement with equally qualified individuals if needed.

Proposer's Project Personnel and Qualifications: Project Approach (Criteria 3.3)

1. Describe the team's overall project approach for this project and a description of planned efforts to provide quality work, meet schedules, and work within an agreed budget.
2. Describe your procedures for providing an accurate punch list, completing the punch list in a timely manner, prepare and submit closeout documents in a timely manner and service and correct all warranty calls in a timely manner.

FINANCIAL STABILITY (CRITERIA 4.1-4.2) – TOTAL 5 POINTS

Financial Stability: Financial Information (Criteria 4.1)

1. Provide last 3 years of audited financial statements (licensed CPA firm required), including full balance sheet and income statements. Financials must include all subsidiaries and entities respective to the firm's overall interests.
2. Bank reference(s): Individual Name, Bank, Address, Phone and state how long. (1 point)
3. Dunn & Bradstreet rating, if available.

Financial Stability: Bonding Information (Criteria 4.2).

1. Bonding Company reference(s): Individual Name, Company, Address, Phone and state how long.
2. Provide your bonding capacity per project and in the aggregate.

OFFERORS PROPOSED CONSTRUCTION SCHEDULE – TOTAL 10 POINTS

All work completed by July 31, 2026

1. Provide a detailed work schedule for all work up to Substantial Completion on July 31, 2026.

PRICE PROPOSALS – TOTAL 50 POINTS

The Owner will consider the total contract cost listed in the **RESPONDENT'S MONETARY PROPOSAL FORM** as part of its evaluation. The Owner shall have the right to accept alternates in any order or combination unless otherwise specifically provided in the Proposal Documents. The Respondent submitting the lowest proposed amount shall receive the highest number of points in this category, and the Respondent submitting the highest proposed amount shall receive the lowest number of points awarded in this category. The Respondent shall not provide any additional price proposal information in this **RESPONDENT'S GENERAL QUESTIONNAIRE** section, only the price information provided in the **RESPONDENT'S MONETARY PROPOSAL FORM** will be used for its evaluation.

CONTRACT DOCUMENTS: In addition to your price proposal, provide any comments or requested changes to the form of Contract Documents and include an explanation for the change, otherwise Respondent will be deemed to have accepted the form of the Contract Documents.

The undersigned confirms ATTACHMENT "A1" is enclosed, contains all required information above, and that all information is correct to the best of his/her knowledge.

_____	_____
Authorized Representative (Print Name)	Title
_____	_____
Authorized Representative (Signature)	Date

STATEMENT OF COMPLIANCE/DEVIATION FORM - REQUIRED FORM

This form is a signed statement that all information in the response packet complies with all specifications, terms and conditions, scope, and/or qualifications contained in the solicitation document. If the undersigned Respondent intends to deviate from the listed specifications, terms and conditions, scope, and/or qualifications contained in the solicitation document, all such deviations must be listed on this page, with complete and detailed conditions and information included or attached. The District will consider any deviations in its award decisions, and reserves the right to accept or reject any proposal based upon any deviations indicated below or in any attachments or inclusions. In the absence of any deviation entry on this form, the Respondent assures Calallen ISD of their full compliance with the General Terms and Conditions, Item Specifications, and all other information contained in this Proposal Invitation.

_____ No Deviations _____ Yes Deviations

List any deviations your company is submitting below, if applicable (Attach additional sheet if necessary):

_____

_____

_____

If you are requesting any modifications to the form of Agreement included with the RFCSP package, please indicate those and attach them to this form.

List any Addenda your company is submitting below (Attach additional sheet if necessary):

_____ No Addenda Included

Addendum Number: _____ Addendum Description: _____

Addendum Number: _____ Addendum Description: _____

Addendum Number: _____ Addendum Description: _____

Addendum Number: _____ Addendum Description: _____

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

REFERENCES - REQUIRED FORM

Please complete the reference fields below. Vendor should list as references school districts and/or other governmental entities (other than Calallen ISD) for which vendor has provided products or services similar to what is requested on this proposal. Additional references for the can be provided as an attachment, but the minimum required for this proposal is 3 references.

Reference 1
Name of Entity:
Contact Name & Title:
Mailing Address:
Phone Number:
Email Address:
Date of Similar Products/Services Delivered:
Brief Description of Similar Products/Services Delivered:

Reference 2
Name of Entity:
Contact Name & Title:
Mailing Address:
Phone Number:
Email Address:
Date of Similar Products/Services Delivered:
Brief Description of Similar Products/Services Delivered:

Reference 3
Name of Entity:
Contact Name & Title:
Mailing Address:
Phone Number:
Email Address:
Date of Similar Products/Services Delivered:
Brief Description of Similar Products/Services Delivered:

The undersigned confirms the above information is correct to the best of his/her knowledge and understands the District may contact any of the above.

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

CERTIFICATE OF RESIDENCY - REQUIRED FORM

Pursuant to Government Code, Chapter 2252 a district may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the greater of the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located, or the state in which a majority of the manufacturing relating to the contract will be performed. (Gov't Code 2252.002).

Definitions (Gov't Code 2252.001)

- "Governmental contract" means a contract awarded by a governmental entity, including a public school district, for general construction, an improvement, a service, or a public works project or for a purchase of supplies, materials, or equipment.
- "Resident bidder" refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state (Texas).
- "Nonresident bidder" refers to a person who is not a resident.

Indicate the certification of residency that applies:

_____ My company is a "resident Respondent"

_____ My company is a "nonresident Respondent" of _____(the state your principal place of business is located)

If applicable, does your "resident state" require Respondent whose principal place of business is in Texas to under Proposal, Respondents who resident state is the same as yours by a prescribes amount or percentage to receive a comparable contract?

_____ No

_____ Yes, the amount or percentage is _____

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

CERTIFICATIONS REGARDING LOBBYING, DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS, AND DRUG-FREE WORKPLACE REQUIREMENTS – REQUIRED FORM

Lobbying: This certification is required by the Federal Regulations, implementing Section 1352 of the Program Fraud and Civil Remedies Act, Title 31 U.S. Code, for the Department of Education (34 CFR Part 82), Department of Health and Human Services (45 CFR Part 93).

The undersigned contractor certifies that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan or cooperative agreement.

(2) If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with this federal contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form – LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

Debarment, Suspension, and Other Responsibility Matters: This certification is required by the Federal Regulations, implementing, Executive Order 12549, Government-wide Debarment and Suspension, for the Department of Agriculture (7 CFR Part 3017), Department of Labor (29 CFR Part 98), Department of Education (34 CFR Parts 85, 668 and 682), Department of Health and Human Services (45 CFR Part 76).

The undersigned contractor certifies that neither it nor its principals:

(1) Are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency.

(2) Have not within a three-year period preceding this contract been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, State or Local) transaction or contract under a public transaction, violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; Are not presently indicted for or otherwise criminally or civilly charged by a

governmental entity with commission of any of the offenses enumerated in Paragraph (2) of this certification; and,

(3) Have not within a three-year period preceding this contract had one or more public transactions terminated for cause or default.

Where the prospective recipient of federal assistance funds is unable to certify to any of the statements in this certification, such prospective recipient shall attach an explanation to this certification.

Drug-Free Workplace: This certification is required by the Federal Regulations, implementing Sections 5151-5160 of the Drug-Free Workplace Act, 41 U.S.C. 701; for the Department of Agriculture (7 CFR Part 3017), Department of Labor (29 CFR Part 98), Department of Education (34 CFR Parts 85, 668 and 682), and Department of Health and Human Services (45 CFR Part 76).

The undersigned contractor certifies that it shall provide a drug-free workplace by:

(a) Publishing a policy statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the workplace and specifying the consequences of any such action by an employee;

(b) Establishing an ongoing drug-free awareness program to inform employees of the dangers of drug abuse in the workplace, the Contractor's policy of maintaining a drug-free workplace, the availability of counseling, rehabilitation and employee assistance programs, and the penalties that may be imposed on employees for drug abuse violations in the workplace;

(c) Providing each employee with a copy of the Contractor's policy statement;

(d) Notifying the employees in the Contractor's policy statement that as a condition of employment under this contract, employees shall abide by the terms of the policy statement and notifying the Contractor in writing within five days after any conviction for a violation by the employee of a criminal drug statute in the workplace;

(e) Notifying the District within ten days of Contractor's receipt of a notice of a conviction of an employee; and,

(f) Taking appropriate personnel action against an employee convicted of violating a criminal drug statute or require such employee to participate in a drug abuse assistance or rehabilitation program.

These certifications are a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction.

_____	_____
Authorized Representative (Print Name)	Title
_____	_____
Authorized Representative (Signature)	Date

TEXAS CORPORATE FRANCHISE TAX CERTIFICATION - REQUIRED FORM

Pursuant to Article 2.45, Texas Business Corporation Act, state agencies may not contract with for Profit Corporation's that are delinquent in making state franchise tax payments. The following certification that the corporation entering into this contract is current in its franchise taxes must be signed by the individual on Form 203, Corporate Board of Directors Resolution, to sign the contract for the corporation.

The undersigned authorized representative of the corporation contracting herein certifies that the following indicated statement is true and correct and that the undersigned understands making a false statement is a material breach of contract and is grounds for contract cancellation.

Indicate the certification that applies to your corporation:

_____ The Corporation is a for-profit corporation and certifies that it is not delinquent in its franchise tax payments to the State of Texas.

_____ The Corporation is a non-profit corporation or is otherwise not subject to payment of franchise taxes to the State of Texas.

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

CRIMINAL HISTORY RECORDS CHECKS - REQUIRED FORM

All Respondents and its subcontractors of every tier must comply with the Section 13.3 Criminal History Records Checks of the AIA Document A105 – 2017 Standard Short Form of Agreement Between Owner and Contract found in Appendix 1 of this RFCSP.

In accordance with Section 13.3, all Respondents will provide written certification to the District that (select one):

- ☐ Contractor and its Subcontractors of every tier, do not have any Covered Employees, as defined;
- ☐ Contractor and its Subcontractors of every tier are otherwise exempted from compliance with the requirement contained herein; or
- ☐ Contractor and its Subcontractors of every tier have complied with the statutory requirements of this Agreement as of this date.

Respondent agrees that if it receives information that a Covered Employee is arrested or convicted for any of the Disqualifying Criminal History offenses, during the performance of the Work, Contractor will immediately remove the Covered Employee from Owner's property or other location where students are regularly present, and notify the District of said removal within three (3) days of doing so.

I, the undersigned agent for the firm named below, certify that the information concerning criminal background checks has been reviewed by me, the following information furnished is true to the best of my knowledge and I acknowledge compliance with this section.

_____	_____
Authorized Representative (Print Name)	Title
_____	_____
Authorized Representative (Signature)	Date

FELONY CONVICTION NOTICE - REQUIRED FORM

State of Texas Legislative Senate Bill No. 1, Section 44.034, Notification of Criminal History,
Subsection (a), states "a person or business entity that enters into a contract with a school district must give advance notice to the district if the person or owner or operator of the business entity has been convicted of a felony." The notice must include a general description of the conduct resulting in the conviction of a felony.

Subsection (b) states "a school district may terminate a contract with a person or business entity if the district determines that the person or business entity failed to give notice as required by
Subsection (a) or misrepresented the conduct resulting in the conviction. The district must compensate the person or business entity for services performed before the termination of the contract."

You must check A, B or C and sign below:

_____ A. Our firm is a publicly held corporation, therefore, this reporting requirement is not applicable.

_____ B. Our firm is not owned or operated by anyone who has been convicted of a felony.

_____ C. Our firm is owned or operated by the following individual(s) who has/have been convicted of a felony.

Vendor Name: _____

Name of Individual(s): _____
(Attach additional sheets if necessary)

Details of Conviction(s): _____

_____
(Attach additional sheets if necessary)

I, the undersigned for the firm named below, certify that the information concerning notification of felony convictions has been by me and the following information furnished is true to the best of my knowledge.

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

STATE ASSESSMENT CERTIFICATION - REQUIRED FORM

The undersigned authorized representative of the corporation contracting herein certifies that the following indicated statement is true and correct and that the undersigned understands making a false statement is a material breach of contract and is grounds for contract cancellation.

The corporation certifies that:

_____ It is current in Unemployment Insurance taxes, Payday and Child Labor law monetary obligations, and Proprietary School fees and assessments payable to the State of Texas.

_____ It has no outstanding Unemployment Insurance overpayment balance payable to the State of Texas.

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

REQUIRED STATE AND FEDERAL CERTIFICATIONS - REQUIRED FORM

Certification Regarding Terrorist Organizations. Pursuant to Sections 2252.151-.154 of the Texas Government Code, the Contractor hereby certifies that it is not a company identified on the Texas Comptroller's list of companies known to have contracts with, or provide supplies or services to, a foreign organization designated as a Foreign Terrorist Organization by the U.S. Secretary of State under federal law.

Certification Regarding Boycotting of Israel. Pursuant to Sections 2270.001-.002, 808.001-.006, .051-.057, .101-.102 of the Texas Government Code, the Contractor hereby certifies and verifies that neither the Contractor, nor any affiliate, subsidiary, or parent company of the Contractor, if any (the "Contractor Companies"), boycotts Israel, and the Contractor agrees that the Contractor and Contractor Companies will not boycott Israel during the term of this Agreement. For purposes of this Agreement, the term "boycott" shall mean and include terminating business activities or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory

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The undersigned authorized representative of the corporation contracting herein certifies that the following indicated statement is true and correct and that the undersigned understands making a false statement is a material breach of contract and is grounds for contract cancellation.

The contractor certifies that:

_____ It is not doing business with any organization indicated on the Foreign Terrorist Organization list as so designated by the U.S. Secretary of State under Federal Law.

_____ that neither the Contractor, nor any affiliate, subsidiary, or parent company of the Contractor, if any (the "Contractor Companies"), boycotts Israel.

Certification Regarding Boycotting Energy Companies. Pursuant to Texas Government Code Chapter 2274, the Contractor hereby certifies and verifies that it does not boycott energy companies; and will not boycott energy companies during the term of the Agreement. This verification is not required for an agreement where a governmental entity determines that these requirements are inconsistent with the governmental entity's constitutional or statutory duties related to the issuance, incurrence, or management of debt obligations or the deposit, custody, management, borrowing, or investment of funds.

Certification Regarding Discriminating Against Firearm Industry. Pursuant to Texas Government Code Chapter 2274, the Contractor hereby certifies and verifies that it does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association; and will not discriminate during the term of the contract against a firearm entity or firearm trade association. The verification is not required for contracts with a sole-source provider or if the governmental entity does not receive any bids from a company that is able to provide the required verification.

The undersigned authorized representative of the corporation contracting herein certifies that the following indicated statement is true and correct and that the undersigned understands making a false statement is a material breach of contract and is grounds for contract cancellation.

The contractor certifies that:

_____ By entering into this Agreement, the Contractor represents and warrants that: (1) it does not, and will not for the duration of the contract, boycott energy companies or (2) the verification required by Section 2274.002 of the Texas Government Code does not apply to the contract.

_____ By entering into this Agreement, the Contractor verifies that: (1) it does not, and will not for the duration of the contract, have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association or (2) the verification required by Section 2274.002 of the Texas Government Code does not apply to the contract

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

CONFLICT OF INTEREST QUESTIONNAIRE – FORM CIQ - REQUIRED FORM

A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with the district and:

1. Has an employment or other business relationship with a local government officer of the district, or a family member of the officer, described by Local Government Code 176.003(a)(2)(A);
2. Has given a local government officer of the district, or a family member of the officer, one or more gifts with the aggregate value specified by Local Government Code 176.003(a)(2)(B), excluding any gift described by Local Government Code 176.003(a-1); or
3. Has a family relationship with a local government officer of the district

---

The Vendor certifies that:

____ No conflict of interest exists

____ A possible or potential conflict of interest exists. Form CIQ completed (or attached) on the following page.

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

A copy of the form is attached hereto and must be submitted if applicable.

CONFLICT OF INTEREST QUESTIONNAIRE — FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

_____
Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

_____ _____
Signature of vendor doing business with the governmental entity — Date

Form provided by Texas Ethics Commission — www.ethics.state.tx.us — Revised 1/1/2021

CERTIFICATE OF INTERESTED PARTIES - REQUIRED FORM

In 2015, the Texas Legislature adopted House Bill 1295, which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. The disclosure requirement applies to a contract entered into on or after January 1, 2016.

The requirement above applies only to a contract of a district that:

1. Requires an action or vote by the board before the contract may be signed;
2. Has a value of at least $1 million; or
3. Is for services that would require a person to register as a lobbyist under Government Code Chapter 305.

Gov't Code 2252.908

The disclosure requirement does not apply to a contract with:

1. A publicly traded business entity, including a wholly owned subsidiary of the entity;
2. An electric utility, as defined by Utilities Code 31.002; or
3. A gas utility, as defined by Utilities Code 121.001.

Gov't Code 2252.908(c)(4)–(6)

Filing Process: The commission has made available on its website a new filing application that must be used to file Form 1295. A business entity must use the application to enter the required information on Form 1295 and print a copy of the completed form, which will include a certification of filing that will contain a unique certification number. An authorized agent of the business entity must sign the printed copy of the form and have the form notarized. The completed Form 1295 with the certification of filing must be filed with Calallen ISD.

Form Availability: Certificate of Interested Parties Form is available from the Texas Ethics Commission website at the following address: https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm For questions regarding and assistance in filling out this form, please contact the Texas Ethics Commission at 512-463-5800. A sample is attached hereto but must be submitted only.

The contractor certifies that:

____ Form 1295 filing is required and a certification of filing will be provided to Calallen ISD should we be awarded the contract

_____ Form 1295 filing is not required

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

CERTIFICATE OF INTERESTED PARTIES — FORM 1295

Complete Nos. 1 - 4 and 6 if there are interested parties.
Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.

OFFICE USE ONLY

1 **Name of business entity filing form, and the city, state and country of the business entity's place of business.**

2 **Name of governmental entity or state agency that is a party to the contract for which the form is being filed.**

3 **Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the services, goods, or other property to be provided under the contract.**

4 Name of Interested Party	City, State, Country (place of business)	Nature of Interest (check applicable)	
		Controlling	Intermediary

5 **Check only if there is NO Interested Party.** ☐

6 **UNSWORN DECLARATION**

My name is _____, and my date of birth is _____.

My address is _____, _____, _____, _____, _____.
(street) (city) (state) (zip code) (country)

I declare under penalty of perjury that the foregoing is true and correct.

Executed in _____ County, State of _____, on the _____ day of _____, 20_____.
(month) (year)

_____
Signature of authorized agent of contracting business entity
(Declarant)

ADD ADDITIONAL PAGES AS NECESSARY

Form provided by Texas Ethics Commission www.ethics.state.tx.us Revised 12/22/2017

Must file online at www.ethics.state.tx.us/File

AFFIDAVIT OF NON-COLLUSION, NON-CONFLICT OF INTEREST, AND ANTI-LOBBYING - REQUIRED FORM

By submission of this proposal, the undersigned certifies that:

1. Neither the Respondent nor any of Respondent's officers, partners, owners, agents, representatives, employees, or parties in interest, has in any way colluded, conspired, or agreed, directly or indirectly with any person, firm, corporation or other Respondent or potential Respondent any money or other valuable consideration for assistance in procuring or attempting to procure a contract or fix the prices in the attached proposal or the proposal of any other Respondent, and further states that no such money or other reward will be hereinafter paid.

2. No attempt has been or will be made by this company's officers, employees, or agents to lobby, directly or indirectly, the Calallen ISD Board of Trustees between proposal submission date and award by the Calallen ISD Board of Trustees.

3. No officer or stockholder of the Respondent is a member of the staff or related to any employee or Board of Trustees member of the Calallen ISD except as noted on Form CIQ (Conflict of Interest Questionnaire - attached).

4. The undersigned certifies that he/she is fully informed regarding the accuracy of the statements contained in this certification, and that the penalties herein are applicable to the Respondent as well as to any person signing in his/her behalf.

_____	_____
Authorized Representative (Print Name)	Title
_____	_____
Authorized Representative (Signature)	Date

ORIENTATION TO COMPLAINT PROCEDURES FOR SERVICE PROVIDERS – REQUIRED FORM

The policy of Calallen ISD herein referred to as "the District" is to resolve complaints in a fair and prompt manner. The Districts administrative directive on GRIEVANCE PROCEDURE establishes the guidelines for the resolution of grievances/complaints and requires this orientation sheet be received and acknowledged by all individuals or organizations providing services to the District under contract or agreement.

Acts of restraint, interference, coercion, discrimination or reprisal towards complainants exercising their rights to a file a grievance under District policy are prohibited. A complainant is the individual or organization filing a grievance/complaint. A respondent is the individual or organization against whom a grievance/complaint if filed. Inquiries regarding the resolution of grievances should be addressed to:

Calallen Independent School District
ATTN: Blair McDavid
4205 Wildcat Dr.
Corpus Christi, Texas 78410
Telephone: (361) 242-5600

Every effort should be made to resolve your grievance at the optimum management level. The District's EO Officer is available to assist, as necessary, in the grievance resolution process.

The time limit to file a complaint under the District's grievance procedure is 30 calendar days from the date of the event that leads to the filing of the grievance. A copy of the District's Policy and Procedure is available upon request.

EQUAL OPPORTUNITY IS THE LAW

The District is prohibited from discriminating on the ground of race, color, religion, sex, national origin, age, disability, political affiliation or belief, and for beneficiaries only. If you think that you have been subjected to discrimination, you may file a complaint within 180 days from the date of the alleged violation with the Equal Opportunity Officer at the:

TEXAS WORKFORCE COMMISSION
WORKFORCE DEVELOPMENT DIVISION
EQUAL OPPORTUNITY OFFICE
101 E. 15th STREET
AUSTIN, TEXAS 78778
Telephones: (512) 936-0342; (TDD): 1-800-RELAY TX, Voice 1-800-RELAY VV.

_____	_____
Authorized Representative (Print Name)	Title
_____	_____
Authorized Representative (Signature)	Date

CERTIFICATE OF LIABILITY - REQUIRED *(Provide Copy)*

Please provide a Copy of Your Certificate of Liability Insurance.

Provide actual Certificate of Liability Insurance as part of your proposal

CERTIFICATE OF LIABILITY INSURANCE					DATE	
PRODUCER **SAMPLE ONLY**					THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.	
					COMPANIES AFFORDING COVERAGE	
INSURED **SAMPLE ONLY**					COMPANY A	
					COMPANY B	
					COMPANY C	
					COMPANY D	
COVERAGES THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN. THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.						
CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY				GENERAL AGGREGATE	$1,000,000.00
	X COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG	$1,000,000.00
	CLAIMS MADE [X] OCCUR				PERSONAL & ADV INJURY	$1,000,000.00
	X OWNERS PROTECTIVE LIABILITY				EACH OCCURRENCE	$1,000,000.00
	THE STATE OF TEXAS, IT'S EMPLOYEES, NAME INSURED (SEE BELOW)				FIRE DAMAGE (Any one fire)	$ 50,000.00
					MED EXP (Any one person)	$ 5,000.00
	AUTOMOBILE LIABILITY					
	ANY AUTO				COMBINED SINGLE LIMIT	$1,000,000.00
	ALL OWNED AUTOS				BODILY INJURY (Per person)	$
	X SCHEDULED AUTOS					
	X HIRED AUTOS				BODILY INJURY (Per accident)	$
	X NON-OWNED AUTOS					
					PROPERTY DAMAGE	$
						$
	GARAGE LIABILITY				AUTO ONLY-EA ACCIDENT	$
	ANY AUTO				OTHER THAN AUTO ONLY:	
					EACH ACCIDENT	$
					AGGREGATE	$
	EXCESS LIABILITY				EACH OCCURRENCE	$
	UMBRELLA FORM				AGGREGATE	$
	OTHER THAN UMBRELLA FORM					$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				X WC STATUTORY LIMITS OTH-ER	
	THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: [ ] INCL [ ] EXCL				EL EACH ACCIDENT	$ 500,000.00
					EL DISEASE-Policy Limit	$ 500,000.00
					EL DISEASE-Ea. Employee	$ 500,000.00
x	x OTHER: BUILDERS RISK				AMOUNT OF CONTRACT	
X	OWNRS PROTECTIVE LIABILITY NAMED INSURED, THE STATE OF TEXAS, IT'S EMPLOYEES					$1,000,000.00
DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS (PROJECT ADDRESS) **SAMPLE ONLY**						
CERTIFICATE HOLDER					CANCELLATION	
TEXAS WORKFORCE COMMISSION 101 East 15th Street, Room 226T Austin, Texas 78778-0001					SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEROF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 10 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE	

W9 TAXPAYER IDENTIFICATION CERTIFICATION - REQUIRED FORM

Provide a completed IRS Form W-9 as part of your proposal – available at https://www.irs.gov/forms-pubs/about-form-w-9.

Form W-9 (Rev. January 2011)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give Form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name/disregarded entity name, if different from above

Check appropriate box for federal tax classification (required): ☐ Individual/sole proprietor ☐ C Corporation ☐ S Corporation ☐ Partnership ☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C–C corporation, S–S corporation, P–partnership) ►

☐ Other (see instructions) ►

☐ Exempt payee

Address (number, street, and apt. or suite no.)

Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on the "Name" line to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number

___ – ___ – ____

Employer identification number

__ – _____

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here **Signature of U.S. person** ► **Date** ►

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

Cat. No. 10231X Form **W-9** (Rev. 1-2011)

PAYMENT AND PERFORMANCE BONDS - REQUIRED FORM

A district that makes a public work contract with a prime contractor shall require the contractor, before beginning the work, to execute to the district:

1. A performance bond if the contract is in excess of $100,000; and
2. A payment bond if the contract is in excess of $25,000.

A bond required by this provision must be executed by a corporate surety in accordance with Insurance Code Article 7.19-1 (now Insurance Code 3503.001–.005). A bond for a public work contract with a district must be payable to and its form must be approved by the awarding board. *Gov't Code 2253.021(a), (d)–(e).*

The performance bond is solely for the protection of the district awarding the public work contract, in the amount of the contract, and conditioned on the faithful performance of the work in accordance with the plans, specifications, and contract documents. *Gov't Code 2253.021(b).*

The payment bond is solely for the protection and use of payment bond beneficiaries who have a direct contractual relationship with the prime contractor or a subcontractor to supply public work labor or material, and in the amount of the contract. *Gov't Code 2253.021(c).*

The contractor certifies that:

____ A performance bond is required and will be provided to Calallen ISD should we be awarded the contract

_____ A performance bond is not required

____ A payment bond is required and will be provided to Calallen ISD should we be awarded the contract

_____ A payment bond is not required

_____ _____
Authorized Representative (Print Name) Title

_____ _____
Authorized Representative (Signature) Date

PREVAILING WAGE SCHEDULES - REQUIRED FORM

Respondents are required to comply with Texas Government Code, Chapter 2258 Prevailing Wage Rates, with respect to payment of prevailing wage rates for the construction or improvements, paid for in whole or in part from public funds, without regard to whether the work is done under public supervision or direction. A worker is employed on a public work if the worker is employed by the Respondent or any subcontractor in the execution of the contract for the project.

The District has adopted the federal Davis-Bacon wage rates for the use in Texas pursuant to and in accordance with the Texas Government Code, Section 2258.022. The District's prevailing wage rate is provided as Exhibit A to APPENDIX 1 the STANDARD SHORT FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR, AIA DOCUMENT A105-2017.

Please sign below confirming receipt of the District's current Prevailing Wage Rate Schedule. Contractor will be required to pay these wages as set out in the form of Agreement.

_____	_____
Authorized Representative (Print Name)	Title
_____	_____
Authorized Representative (Signature)	Date

ATTACHMENT "A1"

REQUIRED FORM

RESPONDENT'S GENERAL QUESTIONNAIRE SUPPORTING DOCUMENTATION

To RFCSP FOR HIGH SCHOOL STADIUM IMPROVEMENTS - TWO PROCUREMENT PROPOSAL RESPONSE PACKET

RESPONDENT'S GENERAL QUESTIONNAIRE
(With Criteria, Weights, and Methodology)

CONTRACTOR SHALL ATTACH AND INCLUDE ALL REQUIRED SUPPORTING DOCUMENTATION FOR CRITERIA, WEIGHTS AND METHODOLOGY AS IDENTIFIED IN THE ATTACHMENT "A" PROCUREMENT PROPOSAL RESPONSE PACKET PAGE 8 THROUGH 11

EXHIBIT A

To AIA® Document A101® – 2017
Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, as Modified By Owner

PROJECT: Calallen Independent School District: Calallen High School Stadium Improvements Project (2024 Bond) located at Phil Danaher Stadium 4001 Wildcat Drive, Corpus Christi, Texas 78410
OWNER: Calallen Independent School District
ARCHITECT: Rawley McCoy and Associates, PLLC
CONTRACTOR: _____

LIST OF DRAWINGS

[To Be Inserted]

AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor *where the basis of payment is a Stipulated Sum*

DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME

AGREEMENT made as of the _____ day of _____ in the year TWO THOUSAND TWENTY-FIVE (2025)
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

Calallen Independent School District, a political subdivision and public school district of the State of Texas
4205 Wildcat Drive
Corpus Christi, Texas
Phone: 361-242-5600

and the Contractor:
(Name, legal status, address and other information)

DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME

_____, a _____ of the State of _____
[Address]
[Address continued]
Phone: _____
Fax: _____
E-mail: _____

for the following Project:
(Name, location and detailed description)

Calallen Independent School District: Calallen High School Stadium Improvements Project (2024 Bond) located at Phil Danaher Stadium 4001 Wildcat Drive, Corpus Christi, Texas 78410

The Architect:
(Name, legal status, address and other information)

Rawley McCoy and Associates, PLLC, a professional limited liability company of the State of Texas
1908 N. Laurent Street, Suite 540
Victoria, Texas 77901
Phone: (361) 573-1642

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

Init.
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TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

NOTE: Any reference hereinafter this one, to an AIA™ Document or any AIA Documents included in the Contract Documents shall refer to such document "as modified for this Project". In addition, any reference to AIA Documents shall all be considered to have included the Trademark "™" after the AIA reference, whether or not included in the text. The AIA Documents are registered intellectual property of the American Institute of Architects and use and amendment of such forms is permitted under license granted to Walsh Gallegos Trevino Kyle & Robinson P.C. for this Project. No use may be made of this AIA document other than as Contract Documents for this Project.

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ARTICLE 1 THE CONTRACT DOCUMENTS

§ 1.1 The Contract Documents consist of this Agreement, General Conditions of the Contract and other Conditions and Project Manual to the extent they are consistent with other portions of the Contract Documents), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9. The order of precedence of the Contract Documents shall be as set out in Section 1.2.4 of the AIA Document A201-2017.

§ 1.2 The Board of Trustees, by majority vote, is the only representative of the Owner, an independent school district, having the power to enter into or amend a contract, to approve changes in the scope of the Work, to approve and execute a Change Order or construction Change Directive modifying the Contract Sum, or to agree to an extension to the date of Substantial or Final Completion or to terminate a contract. The Owner designates the following as the individual authorities to sign documents on behalf of the Board of Trustees, following appropriate Board action: **DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME** or other Board designee.

§ 1.3 The Board designates the authorized representatives identified in Paragraph 8.3 to act on its behalf in other respects.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[ ] The date of this Agreement.

[ ] A date set forth in a notice to proceed issued by the Owner.

[X] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

Construction Commences: January 1, 2026

Please note that prior to commencing construction, the Contractor must provide Owner and Architect all required payment and performance bonds and proof of insurance, in compliance with Article 11 of the AIA document A201-2017.

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[ ] Not later than _____ (____) calendar days from the date of commencement of the Work.

[X] By the following date: July 31, 2026

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Final Completion shall be thirty (30) calendar days after the date of Substantial Completion, subject to adjustments of the Contract Time as provided in the Contract Documents.

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
None.	

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be **DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME** ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME	

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance
DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME		

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price
DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME	

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)
DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME		

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, the Owner shall be entitled to retain or recover from the Contractor and the Contractor's surety, as liquidated damages and not as a penalty, the following per diem amounts commencing upon the first day following expiration of the Contract Time and continuing until the actual Date of Substantial Completion. Such liquidated damages are hereby agreed to be a

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User Notes: (1986737237)

reasonable estimate of damages the Owner will incur as a result of delayed completion of the Work: FIVE HUNDRED DOLLARS ($500.00).

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

None.

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 The Contractor shall submit monthly Applications for Payment to the Architect not later than the last day of each month, on AIA Form G702 for approval. Continuation sheets shall be submitted on AIA Form G703. The Architect will have seven business days to approve the Contractor's Application and submit its Certificate for Payment to the Owner. The Architect may require from the Contractor any additional information required by the Contract Documents and deemed necessary to substantiate the Application for Payment. The Owner shall pay to the Contractor, the certified undisputed amounts in the Payment Application to the Contractor not later than 30 days from the Owner's receipt of the Certificate of Payment from the Architect if the Owner's Board meets twice a month or more, and 45 days from the Owner's receipt of the Certificate of Payment from the Architect if the Owner's Board meets only once per month.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work, as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values;

.2 If approved in advance by the Owner, that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;

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.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017, or amounts certified by the Architect and disputed by the Owner; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

Five Percent (5%)

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)
N/A

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

After the Certificate of Substantial Completion is accepted by the Owner, the Owner may, in its sole discretion and upon approval of its Board of Trustees and acceptance and consent of surety, make payment of retainage on all or a part of the Work accepted.

§ 5.1.7.3
(Paragraphs deleted)
Retainage is not due to the Contractor until thirty-one (31) days after Final Payment for the Work as set out in Section 9.10 of AIA Document A201-2017.

§ 5.1.8 [Paragraph Deleted.]

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, shall not be made by the Owner to the Contractor until:

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment;

.2 all conditions precedent to final payment have been fulfilled including those listed in Section 9.10.2 of the AIA Document A201–2017;

.3 Contractor has submitted a signed document indicating consent of its Surety to Final Payment; and

.4 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than thirty-one (31) days after the issuance of the Architect's final Certificate for Payment.

§ 5.3 Interest

(Paragraphs deleted)
Undisputed payments remaining unpaid under the Contract on the 31st day after the date the Owner receives a properly documented Certificate of Payment from the Architect are considered overdue and in accordance with the

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Texas Prompt Payment Act, Texas Government Code Chapter 2251, shall bear interest from that date until the date that the Owner mails or electronically transmits payment, including accrued interest to that date.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document
(Paragraphs deleted)
A201–2017.

§ 6.2 Binding Dispute Resolution

For any Claim not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[ ] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[X] Litigation in a court of competent jurisdiction

[ ] Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

§ 6.3 When Owner has an applicable claim for construction defects, Owner shall comply with the provisions of Texas Government Code Chapter 2272 related to the provision of notice of defects and the Contractor's or Architect's opportunity to cure.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1
(Paragraphs deleted)
[Paragraph Deleted.]

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

Emily Lorenz, Superintendent
Calallen Independent School District
4205 Wildcat Drive
Corpus Christi, Texas 78410
Phone: (361) 242-5600
Email: elorenz@calallen.org

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

Init.
/
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Name: _____ Title: _____
Address: _____
Phone: _____
Email: _____

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten (10) days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A201™–2017, General Conditions of the Contract for Construction, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in Article 11 of the AIA Document A201™–2017, General Conditions of the Contract of Construction, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with

(Paragraphs deleted)

AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or in any other format agreed to by the Owner, Contractor and Architect in writing.

§ 8.7 Other provisions:

§ 8.7.1 Pursuant to Texas Government Code Chapter 2271, as amended, if this contract is valued at $100,000 or more and if the Contractor has at least ten (10) full time employees, then the Contractor, by its execution of this Agreement represents and warrants to the Owner that the Contractor does not boycott Israel and will not boycott Israel during the term of this Agreement. This section does not apply to a sole proprietorship.

§ 8.7.2 By signing this Agreement, the undersigned certifies as follows: Under Section 231.006 of the Texas Family Code, the Contractor certifies that the individual or business entity named in this Contract is not ineligible to receive the specified payments and acknowledges that this Contract may be terminated and payment withheld if this certification is inaccurate.

§ 8.7.3 Contractor verifies and affirms that it is not a foreign terrorist organization as identified on the list prepared and maintained by the Texas Comptroller of Public Accounts. If Contractor has misrepresented its inclusion on the Comptroller's list such omission or misrepresentation will void this Agreement.

§ 8.7.4 The requirements of Subchapter J, Chapter 552, Government Code, may apply to this Contract and the Contractor agrees that the contract can be terminated if the Contractor knowingly or intentionally fails to comply with a requirement of that subchapter. Therefore, if the value of this Project is One Million Dollars ($1,000,000.00) or more, the Contractor agrees to : (1) preserve all contracting information related to the contract as provided by the records retention requirements applicable to the Owner for the duration of the contract; (2) promptly provide to the governmental body any contracting information related to the contract that is in the custody or possession of the entity on request of the Owner; and (3) on completion of the contract, either: (a) provide at no cost to the Owner all contracting information related to the contract that is in the custody or possession of the entity; or (b) preserve the contracting information related to the contract as provided by the records retention requirements applicable to the Owner.

§ 8.7.5 Contractor shall take all actions and shall comply with all federal, state, and local legal requirements, and shall also comply with all recommendations of the Centers for Disease Control.

§ 8.7.6 Pursuant to Texas Education Code §22.08341, Contractor shall provide all information needed by Owner to obtain criminal history record information through the Fingerprint-Based Applicant Clearinghouse of Texas ("FACT Clearinghouse"), for all of Construction Manager's Covered Employee in accordance with the requirements of Section 3.4.5 of the AIA Document A201™–2017, General Conditions of the Contract for Construction.

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§ 8.7.7 Pursuant to Texas Government Code Chapters 2274 and 809, if this contract is valued at $100,000 or more and if Contractor has at least ten (10) full-time employees, then Contractor represents and warrants to the Owner that the Contractor does not boycott energy companies and will not boycott energy companies during the term of this Agreement. This provision does not apply to sole proprietorships.

§ 8.7.8 Pursuant to Texas Government Code Chapter 2274, if this contract is valued at $100,000 or more and if Contractor has at least ten (10) full-time employees, then Contractor represents and warrants to the Owner that the Contractor does not discriminate against firearm entities or firearm trade associations and will not discriminate against firearm entities or firearm trade associations during the term of this Agreement. This provision does not apply to sole proprietorships.

§ 8.7.9 Pursuant to Texas Government Code Chapter 2273, Construction Manager represents and warrants to Owner that Construction Manager is not an abortion provider or affiliate of an abortion provider.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 [Intentionally Deleted.]

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

.4 [Intentionally Deleted.]

(Paragraphs deleted)

.5 Drawings. The Drawings are those prepared by _____dated _____and which are listed in the Index of Drawings attached hereto as **Exhibit A**, which are incorporated herein by reference.

Number	Title	Date
DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME		

.6 Specifications. The Specifications are those prepared by _____dated _____ and which are listed in the Table of Contents attached hereto as **Exhibit B**, which are incorporated herein by reference.

Section	Title	Date	Pages
DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME			

.7 Addenda, if any:

Number	Date	Pages
DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME		

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[ ] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

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[ ] The Sustainability Plan:

Title	Date	Pages
Not applicable.		

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Not Applicable			

NOTE: Any Supplementary Conditions or other Conditions of this Contract listed above, the Project Manual or other terms or conditions attempted to be incorporated into this Contract, which contradict or conflict with the terms of this document or the terms and conditions set out in the AIA Document A201™–2017, General Conditions of the Contract for Construction shall be void and subordinate to the terms set out in the AIA Document A201™–2017, General Conditions of the Contract for Construction.

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

Exhibit A – Index of Drawings
Exhibit B – Table of Contents for Specifications
Exhibit C – Prevailing Wage Rate Schedule

This Agreement entered into as of the day and year first written above.

CALALLEN INDEPENDENT SCHOOL DISTRICT **EXHIBIT TO BID PACKAGE ONLY – NOT FOR SIGNATURE AT THIS TIME**		COMPANY: _____ **EXHIBIT TO BID PACKAGE ONLY – NOT FOR SIGNATURE AT THIS TIME**
OWNER *(Signature)*		CONTRACTOR *(Signature)*
Emily Lorenz Superintendent of Schools Email: elorenz@calallen.org		Name: _____ Title: _____ Email:
(Printed name and title)		*(Printed name and title)*

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Additions and Deletions Report for
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PAGE 1

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AGREEMENT made as of the _____day of _____in the year TWO THOUSAND TWENTY-FIVE (2025)

...

Calallen Independent School District, a political subdivision and public school district of the State of Texas
4205 Wildcat Drive
Corpus Christi, Texas
Phone: 361-242-5600

...

(Name, legal status, address and other information)

DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME

_____, a _____of the State of _____
[Address]
[Address continued]
Phone: _____
Fax: _____
E-mail: _____

...

Calallen Independent School District: Calallen High School Stadium Improvements Project (2024 Bond) located at Phil Danaher Stadium 4001 Wildcat Drive, Corpus Christi, Texas 78410

...

Rawley McCoy and Associates, PLLC, a professional limited liability company of the State of Texas
1908 N. Laurent Street, Suite 540
Victoria, Texas 77901
Phone: (361) 573-1642

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NOTE: Any reference hereinafter this one, to an AIA™ Document or any AIA Documents included in the Contract Documents shall refer to such document "as modified for this Project". In addition, any reference to AIA Documents

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~~EXHIBIT A INSURANCE AND BONDS~~

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PAGE 3

~~The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.~~§ 1.1 The Contract Documents consist of this Agreement, General Conditions of the Contract and other Conditions and Project Manual to the extent they are consistent with other portions of the Contract Documents), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9. The order of precedence of the Contract Documents shall be as set out in Section 1.2.4 of the AIA Document A201-2017.

§ 1.2 The Board of Trustees, by majority vote, is the only representative of the Owner, an independent school district, having the power to enter into or amend a contract, to approve changes in the scope of the Work, to approve and execute a Change Order or construction Change Directive modifying the Contract Sum, or to agree to an extension to the date of Substantial or Final Completion or to terminate a contract. The Owner designates the following as the individual authorities to sign documents on behalf of the Board of Trustees, following appropriate Board action: **DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME** or other Board designee.

§ 1.3 The Board designates the authorized representatives identified in Paragraph 8.3 to act on its behalf in other respects.

...

[X] Established as follows:

...

Construction Commences: January 1, 2026

Please note that prior to commencing construction, the Contractor must provide Owner and Architect all required payment and performance bonds and proof of insurance, in compliance with Article 11 of the AIA document A201-2017.

...

[ ] Not later than ~~( )~~ _____ (____) calendar days from the date of commencement of the Work.

[X] By the following date: July 31, 2026

Final Completion shall be thirty (30) calendar days after the date of Substantial Completion, subject to adjustments of the Contract Time as provided in the Contract Documents.

PAGE 4

None.

...

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be **DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME** ($), subject to additions and deductions as provided in the Contract Documents.

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If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, the Owner shall be entitled to retain or recover from the Contractor and the Contractor's surety, as liquidated damages and not as a penalty, the following per diem amounts commencing upon the first day following expiration of the Contract Time and continuing until the actual Date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable estimate of damages the Owner will incur as a result of delayed completion of the Work: FIVE HUNDRED DOLLARS ($500.00).

PAGE 5

None.

...

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the ~~month, or as follows:~~

month.

§ 5.1.3 ~~Provided that an Application for Payment is received by~~ The Contractor shall submit monthly Applications for Payment to the Architect not later than the ~~day of a month, the Owner shall make payment of the amount certified~~ last day of each month, on AIA Form G702 for approval. Continuation sheets shall be submitted on AIA Form G703. The Architect will have seven business days to approve the Contractor's Application and submit its Certificate for Payment to the Owner. The Architect may require from the Contractor any additional information required by the Contract Documents and deemed necessary to substantiate the Application for Payment. The Owner shall pay to the Contractor, the certified undisputed amounts in the Payment Application to the Contractor not later than ~~the __ day of the __ month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than __ (__) days after the Architect receives the Application for Payment.~~

~~(Federal, state or local laws may require payment within a certain period of time.)~~30 days from the Owner's receipt of the Certificate of Payment from the Architect if the Owner's Board meets twice a month or more, and 45 days from the Owner's receipt of the Certificate of Payment from the Architect if the Owner's Board meets only once per month.

...

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.1 That portion of the Contract Sum properly allocable to completed ~~Work;~~Work, as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values;

.2 ~~That~~ If approved in advance by the Owner, that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, ~~if approved in advance by the Owner,~~ suitably stored off the site at a location agreed upon in writing; and

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document ~~A201–2017;~~ A201–2017, or amounts certified by the Architect and disputed by the Owner; and

...

Five Percent (5%)

...

N/A

...

After the Certificate of Substantial Completion is accepted by the Owner, the Owner may, in its sole discretion and upon approval of its Board of Trustees and acceptance and consent of surety, make payment of retainage on all or a part of the Work accepted.

§ 5.1.7.3 ~~Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:~~

~~*(Insert any other conditions for release of retainage upon Substantial Completion.)*~~

Retainage is not due to the Contractor until thirty-one (31) days after Final Payment for the Work as set out in Section 9.10 of AIA Document A201-2017.

§ 5.1.8 ~~If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.~~[Paragraph Deleted.]

...

§ 5.2.1 Final payment, ~~constituting the entire unpaid balance of the Contract Sum, shall~~ shall not be made by the Owner to the Contractor ~~when~~until:

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment;

.2 all conditions precedent to final payment have been fulfilled including those listed in Section 9.10.2 of the AIA Document A201–2017;

.3 Contractor has submitted a signed document indicating consent of its Surety to Final Payment; and

~~.2~~ .4 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than ~~30~~ thirty-one (31) days after the issuance of the Architect's final Certificate for ~~Payment, or as follows:~~

Payment.

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...

~~Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~
~~*(Insert rate of interest agreed upon, if any.)*~~

~~%~~ Undisputed payments remaining unpaid under the Contract on the 31st day after the date the Owner receives a properly documented Certificate of Payment from the Architect are considered overdue and in accordance with the Texas Prompt Payment Act, Texas Government Code Chapter 2251, shall bear interest from that date until the date that the Owner mails or electronically transmits payment, including accrued interest to that date.
PAGE 7

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document ~~A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.~~
~~*(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*~~

A201–2017.

...

For any Claim ~~subject to, but~~ not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

...

[X] Litigation in a court of competent jurisdiction

...

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

§ 6.3 When Owner has an applicable claim for construction defects, Owner shall comply with the provisions of Texas Government Code Chapter 2272 related to the provision of notice of defects and the Contractor's or Architect's opportunity to cure.

...

§ 7.1.1 ~~If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:~~
~~*(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)*~~

[Paragraph Deleted.]

...

Emily Lorenz, Superintendent
Calallen Independent School District
4205 Wildcat Drive
Corpus Christi, Texas 78410

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Phone: (361) 242-5600
Email: elorenz@calallen.org

...

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Name: _____ Title: _____
Address: _____
Phone: _____
Email: _____

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten (10) days' prior notice to the other party.
PAGE 8

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document ~~A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds,~~ A201™–2017, General Conditions of the Contract for Construction, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in ~~AIA Document A101™–2017 Exhibit A,~~ Article 11 of the AIA Document A201™–2017, General Conditions of the Contract of Construction, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with ~~a building information modeling exhibit, if completed, or as otherwise set forth below:~~
~~*(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)*~~

AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or in any other format agreed to by the Owner, Contractor and Architect in writing.

...

§ 8.7.1 Pursuant to Texas Government Code Chapter 2271, as amended, if this contract is valued at $100,000 or more and if the Contractor has at least ten (10) full time employees, then the Contractor, by its execution of this Agreement represents and warrants to the Owner that the Contractor does not boycott Israel and will not boycott Israel during the term of this Agreement. This section does not apply to a sole proprietorship.

§ 8.7.2 By signing this Agreement, the undersigned certifies as follows: Under Section 231.006 of the Texas Family Code, the Contractor certifies that the individual or business entity named in this Contract is not ineligible to receive the specified payments and acknowledges that this Contract may be terminated and payment withheld if this certification is inaccurate.

§ 8.7.3 Contractor verifies and affirms that it is not a foreign terrorist organization as identified on the list prepared and maintained by the Texas Comptroller of Public Accounts. If Contractor has misrepresented its inclusion on the Comptroller's list such omission or misrepresentation will void this Agreement.

§ 8.7.4 The requirements of Subchapter J, Chapter 552, Government Code, may apply to this Contract and the Contractor agrees that the contract can be terminated if the Contractor knowingly or intentionally fails to comply with a requirement of that subchapter. Therefore, if the value of this Project is One Million Dollars ($1,000,000.00) or more, the Contractor agrees to : (1) preserve all contracting information related to the contract as provided by the records retention requirements applicable to the Owner for the duration of the contract; (2) promptly provide to the governmental body any contracting information related to the contract that is in the custody or possession of the entity on request of the Owner; and (3) on completion of the contract, either: (a) provide at no cost to the Owner all contracting information related to the contract that is in the custody or possession of the entity; or (b) preserve the

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contracting information related to the contract as provided by the records retention requirements applicable to the Owner.

§ 8.7.5 Contractor shall take all actions and shall comply with all federal, state, and local legal requirements, and shall also comply with all recommendations of the Centers for Disease Control.

§ 8.7.6 Pursuant to Texas Education Code §22.08341, Contractor shall provide all information needed by Owner to obtain criminal history record information through the Fingerprint-Based Applicant Clearinghouse of Texas ("FACT Clearinghouse"), for all of Construction Manager's Covered Employee in accordance with the requirements of Section 3.4.5 of the AIA Document A201™–2017, General Conditions of the Contract for Construction.

§ 8.7.7 Pursuant to Texas Government Code Chapters 2274 and 809, if this contract is valued at $100,000 or more and if Contractor has at least ten (10) full-time employees, then Contractor represents and warrants to the Owner that the Contractor does not boycott energy companies and will not boycott energy companies during the term of this Agreement. This provision does not apply to sole proprietorships.

§ 8.7.8 Pursuant to Texas Government Code Chapter 2274, if this contract is valued at $100,000 or more and if Contractor has at least ten (10) full-time employees, then Contractor represents and warrants to the Owner that the Contractor does not discriminate against firearm entities or firearm trade associations and will not discriminate against firearm entities or firearm trade associations during the term of this Agreement. This provision does not apply to sole proprietorships.

§ 8.7.9 Pursuant to Texas Government Code Chapter 2273, Construction Manager represents and warrants to Owner that Construction Manager is not an abortion provider or affiliate of an abortion provider.

.2 ~~AIA Document A101™–2017, Exhibit A, Insurance and Bonds~~ [Intentionally Deleted.]

...

.4 ~~Building information modeling exhibit, dated as indicated below:~~[Intentionally Deleted.]
~~*(Insert the date of the building information modeling exhibit incorporated into this Agreement.)*~~

~~.5 Drawings~~.5 Drawings. The Drawings are those prepared by _____ dated _____ and which are listed in the Index of Drawings attached hereto as **Exhibit A**, which are incorporated herein by reference.

...

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.6 Specifications. The Specifications are those prepared by _____ dated _____ and which are listed in the Table of Contents attached hereto as **Exhibit B**, which are incorporated herein by reference.

...

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...

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Not applicable.

...

Not Applicable

NOTE: Any Supplementary Conditions or other Conditions of this Contract listed above, the Project Manual or other terms or conditions attempted to be incorporated into this Contract, which contradict or conflict with the terms of this document or the terms and conditions set out in the AIA Document A201™–2017, General Conditions of the Contract for Construction shall be void and subordinate to the terms set out in the AIA Document A201™–2017, General Conditions of the Contract for Construction.

...

Exhibit A – Index of Drawings
Exhibit B – Table of Contents for Specifications
Exhibit C – Prevailing Wage Rate Schedule

...

CALALLEN INDEPENDENT SCHOOL DISTRICT **EXHIBIT TO BID PACKAGE ONLY – NOT FOR SIGNATURE AT THIS TIME**		COMPANY: _____ **EXHIBIT TO BID PACKAGE ONLY – NOT FOR SIGNATURE AT THIS TIME**

...

Emily Lorenz Superintendent of Schools Email: elorenz@calallen.org		Name: _____ Title: _____ Email: _____

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 15:17:12 on 09/19/2025 under Order No. 20250116623 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A101™ – 2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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EXHIBIT B

To AIA® Document A101® – 2017
Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, as Modified By Owner

PROJECT: Calallen Independent School District: Calallen High School Stadium Improvements Project (2024 Bond) located at Phil Danaher Stadium 4001 Wildcat Drive, Corpus Christi, Texas 78410
OWNER: Calallen Independent School District
ARCHITECT: Rawley McCoy and Associates, PLLC
CONTRACTOR: _____

TABLE OF CONTENTS OF SPECIFICATIONS

[To Be Inserted]

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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for the following PROJECT:
(Name and location or address)

Calallen Independent School District: Calallen High School Stadium Improvements Project (2024 Bond) located at Phil Danaher Stadium 4001 Wildcat Drive, Corpus Christi, Texas 78410

THE OWNER:
(Name, legal status and address)

Calallen Independent School District, a political subdivision and public school district of the State of Texas
4205 Wildcat Drive
Corpus Christi, Texas 78410
Phone: (361)242-5600

THE ARCHITECT*:
(Name, legal status and address)

Rawley McCoy and Associates, PLLC, a professional limited liability company of the State of Texas
1908 N. Laurent Street, Suite 540
Victoria, Texas 77901
Phone: (361) 573-1642

THE CONTRACTOR

DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME

_____, a _____ of the State of _____
[Address]
[Address continued]
Phone: _____
E-mail: _____

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

Init.
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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, Project Manual and the Bid or Proposal Documents prepared and submitted by the Owner and the Contractor's Bid or Proposal submitted by the Contractor, to the extent they do not conflict with the terms of this Agreement, and other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements. The Contract Documents identified in this Section shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations. In the absence of individual signatures by Owner and Contractor, the Contract Documents identified in the signed contract prevail.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. After execution of the Original Contract Documents, the Contract may thereafter be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

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§ 1.1.9 The terms "bids" or "bidding" shall include any kind of competitive purchasing under the Texas Education Code Chapter 44 and Texas Government Code Chapter 2269.

§ 1.1.10 Miscellaneous Other Words

§ 1.1.10.1 Business Day

The term "business day" is a day the Owner's Administration Building is scheduled to be open for normal business purposes, unless closed by the Owner's Superintendent of Schools for inclement weather or other reason. Days on which the Administration Building is normally closed are Thanksgiving Break, Winter Break, Spring Break, and Summer Break, as well as other federal, state or local days specified in the calendar approved by the Owner's Board of Trustees on an annual basis. A business day does not include a day on which the Owner's Administration Building is open only for the purposes of conducting candidate filing, early voting, elections, or special events.

§ 1.1.10.2 Calendar Day

A calendar day is a day on the Gregorian calendar. The Contact Time is established in calendar days. Extensions of time granted, if any, will be converted to calendar days.

§ 1.1.10.3 Holidays

Owner approved holidays for Contractor's Work are limited to New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

§ 1.1.10.4 Work Day

Work days include all calendar days except Holidays, Saturdays and Sundays.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.1.2 During the course of the Work, should any conflict be found in or between the Contract Documents, the Contractor shall be deemed to have included in the cost of the Work the greater quantity or better quality, or the most stringent requirements, unless Contractor shall have obtained, before the submission of Contractor's Proposal, an interpretation in writing from the Architect as to what shall govern. The Architect, in case of such conflict, may interpret or construe the document so as to obtain the most substantial and complete performance of the Work consistent with the Contract Documents and reasonably inferable therefrom, in the best interests of Owner, and the Architect's interpretation shall be final. The terms and conditions of this clause shall not relieve any party of any other obligation under the Contract Documents.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 Precedence Of The Contract Documents

The most recently issued Document takes precedence over previous issues of the same Document. The order of precedence is as follows with the highest authority listed as "1".

.1 Contract Modifications signed by Contractor and Owner.
.2 Addenda, with those of later date having precedence over those of earlier date.
.3 General Conditions - AIA Document A201-2017, as modified by the Owner for the Project.

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.4 Specifications and Drawings.
.5 Agreement – AIA Document A101-2017 or A133-2019, as modified by the Owner for the Project.
.6 Bid/Proposal Documents including the Project Manual, Contractor's Bid or Proposal Documents (to the extent such Bid or Proposal submitted by the Contractor is part of the Contract Documents and is not inconsistent with other portions of the Contract Documents)

§ 1.2.5 Relation Of Specifications And Drawings
Specifications and Drawings are to be equivalent in authority and priority. Should they disagree in themselves, or with each other, prices shall be based on the better quality and greater quantity of Work indicated. In the event of the above-mentioned disagreements, the resolution shall be determined by the Architect.

§ 1.2.5.1 Drawings and Specifications are to be equivalent in authority and priority. Should they disagree in themselves, or with each other, prices shall be based on the better quality and greater quantity of Work indicated. In the event of the above-mentioned disagreements, the resolution shall be determined by the Architect.

§ 1.2.5.2 Where, in the Drawings and Specifications, certain products, manufacturer's trade names, or catalog numbers are given, it is done for the express purpose of establishing a standard of function, dimension, appearance, and quality of design, in harmony with the Work, and is not intended for the purpose of limiting competition. Materials or equipment shall not be substituted unless such substitution has been specifically accepted for use on this Project by the Architect.

§ 1.2.5.3 When the Work is governed by reference to standards, building codes, manufacturer's instructions, or other documents, unless otherwise specified, the current edition as of the Agreement date shall apply.

§ 1.2.5.4 Requirements of public authorities apply as minimum requirements only and do not supersede more stringent specified requirements.

§ 1.3 Capitalization
Terms capitalized in these General Conditions include those that are: (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation
In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service
§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice
§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered (whether actually received or not) when deposited with the United States Postal Service, postage prepaid, certified mail, return receipt requested, and addressed to the intended recipient at the address shown in this Agreement. Notice may also be given in person, by

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mail, by courier, or by electronic transmission if a method for electronic transmission (e-mail or facsimile) or other commercially reasonable means and will under any of these circumstances, be effective when actually received. Any address for notice may be changed by written notice delivered as provided in this Section 1.6.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit or such other form agreed to by the parties, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance [Paragraph Deleted.]

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the Board of Trustees of the Calallen Independent School District and is referred to throughout the Contract Documents as if singular in number. The Owner may designate in writing one or more persons to represent the Owner; however, such representatives shall have the authority to bind the Owner only to the extent expressly authorized by the Owner and shall have no implied authority. Except as otherwise provided in Section 4.2.1, the Architect does not have the authority to bind the Owner. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner may engage a third-party consultant to represent the Owner. The Owner will notify the Contractor of the identity of such consultant.

§ 2.1.3 The Contractor acknowledges that no lien rights exist with respect to public property.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Pursuant to the requirements of Texas Business and Commerce Code section 56.054(e)(3), the Owner represents that funds are available and have been authorized for the full contract amount of the Work.

§ 2.2.2 [Paragraph Deleted.]

§ 2.2.3 [Paragraph Deleted.]

§ 2.2.4 [Paragraph Deleted.]

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner may furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site, but shall have no duty to do so. Notwithstanding the foregoing, if the Owner provides such survey, the Contractor shall remain responsible to independently investigate the physical characteristics, legal limitations, and utility locations for the Project site. In the event that the Contractor

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damages any utilities during construction, the Contractor shall immediately repair the same at its sole cost and expense.

§ 2.3.5 Information or services required of the Owner by the Contract Documents shall be furnished by the Owner within a reasonable time following actual receipt of a written request.

§ 2.3.6 The Contractor, Owner and Architect shall agree on an appropriate quantity of drawings and specifications to be printed and distributed for bidding purposes. The drawings shall be provided by the Architect and paid for by the Owner.

§ 2.3.7 Owner's personnel or consultant may, but are not required to be present at the construction site during progress of the Work to assist the Architect in the performance of his duties, and to verify the Contractor's record of the number of workmen employed on the Work, their occupational classification, the time each is engaged in the Work, and the equipment used in the performance of the Work for purpose of verification of Contractor's Applications for Payment.

§ 2.3.8 The Owner (either directly or by contract with the Architect) may furnish tests, inspections, and reports, required by law and as otherwise agreed to by the parties, such as structural, mechanical, and chemical tests, tests for air and water pollution, and tests for hazardous materials.

§ 2.3.9 The Owner, (directly or by contract with the Architect), when such services are required, in the professional opinion of the Architect, shall furnish services of geotechnical engineers, which may include test borings, test pits, determinations of soil bearing values, percolation tests, evaluations of hazardous materials, seismic evaluation, ground corrosion tests and resistivity tests, including necessary operations for anticipating subsoil conditions, with written reports and appropriate recommendations.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is defective or not in accordance with the requirements of the Contract Documents as required by Section 12.2, fails to timely carry out Work in accordance with the Contract Documents or is in default of any of its material obligations hereunder, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.. This right shall be in addition to, and not in restriction of, the Owner's right under Section 12.2.

§ 2.5 Owner's Right to Carry Out the Work

§ 2.5.1 If the Contractor is in default in any of its material obligations hereunder, neglects to timely carry out the Work in accordance with the Contract Documents, or fails to correct nonconforming or defective Work as required by Section 12.2, and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or such non-conforming or defective Work with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or such non-conforming or defective Work at the sole cost of the Contractor. The Architect may, pursuant to Section 9.5.1, withhold or nullify the Contractor's Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such default or such non-conforming or defective Work, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure to correct such non-conforming or defective Work. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

§ 2.5.2 Nothing contained in this Section 2.5 is intended to limit or modify any obligations under the law or under the Contract Documents, including any warranty obligations, expressed or implied.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be authorized to do business in the state of Texas and lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this

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Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative, or in the case of a Construction Manager-at-Risk, the Construction Manager-at-Risk, or its authorized representative.

§ 3.1.2 The Contractor shall perform the Work in a good and workmanlike manner and accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Owner or Owner's consultants, if applicable, conducted in accordance with the Contract Documents or activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. The Contractor and each Subcontractor shall evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including without limitation: (1) the location, condition, layout and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools and equipment, and (5) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site, or for price escalations in the marketplace. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or Contract Time in connection with any failure by the Contractor or any Subcontractor to comply with the requirements of this Section.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. Contractor shall not perform any Work it knows involves an error, inconsistency, or omission without further instructions to Contractor or revised Construction Documents from the Architect. The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the Work installed by other contractors, is not guaranteed by the Architect or the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other Work, it shall verify at the site all dimensions relating to such existing or other Work. Any errors due to the Contractor's failure to so verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require. If the Contractor has knowledge that any of the products or systems specified will perform in a manner that will limit the Contractor's ability to satisfactorily perform the Work or honor its warranty, or will result in a limitation of or interference with the Owner's intended use, then the Contractor shall promptly notify the Architect and Owner, in writing providing substantiation for its position.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15; however, nothing in this section shall provide the Contractor with an affirmative claim for damages for delay by Owner or Architect, as such a claim is prohibited under this Contract. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the

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Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 Notwithstanding the delivery of a survey or other documents by the Owner, Contractor shall use reasonable efforts to perform all Work in such a manner so as to avoid damaging any utility lines, cables, pipes, or pipelines on the property. Contractor shall be responsible for, and shall repair at Contractor's own expense, any damage done to lines, cables, pipes, and pipelines identified to Contractor.

§ 3.2.6 The Owner and Contractor agree that the Contract Documents may not be free from errors, inconsistencies, or omissions, and further agree that the Owner makes no warranty as to the completeness or accuracy of the Contract Documents, either express or implied. Execution of the Contract by the Contractor is a representation that the Contractor has thoroughly reviewed and become familiar with the Contract Documents and that the Contractor is not aware of any errors, inconsistencies or omissions in the Contract Documents which would delay the Contractor in the performance of the Contract Work. The Contractor shall not be entitled to any damages or increase in the Contract Amount due to delays or disruptions to the Work. This limitation on damages is further subject to the limitations set forth in Section 15.1.7.

§ 3.2.7 The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for the Architect to evaluate and respond to the Contractor's request for information, where such information was available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner provided information, Contractor prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.2.8 The Contractor shall use the AIA Document G716-2004 "REQUEST FOR INFORMATION" (RFI) form unless otherwise provided in the Contract Documents. The Contractor shall keep a log of all RFI's submitted and number the RFI's consecutively beginning with the number 1.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall assign a Superintendent who shall make decisions on behalf of the Contractor and its subcontractors. The Superintendent shall be on the Project, in this capacity, at all times while Work on the Project is in progress. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 Contractor shall bear responsibility for design and execution of acceptable trenching and shoring procedures, in accordance with Texas Government Code, Section 2166.303 and Texas Health and Safety Code, chapter C, Sections 756.021, *et seq.*, and shall require any applicable subcontractor to comply all such procedures. Trench excavation safety protection shall be a separate pay item, and shall be based on linear feet of trench excavated. Special shoring requirements shall also be a separate pay item, and shall be based on the square feet of shoring used.

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§ 3.3.5 It is understood and agreed that the relationship of Contractor to Owner shall be that of an independent Contractor. Nothing contained herein or inferable herefrom shall be deemed or construed to (1) make Contractor the agent, servant, or employee of the Owner, or (2) create any partnership, joint venture, or other association between Owner and Contractor. Any direction or instruction by Owner in respect of the Work shall relate to the results the Owner desires to obtain from the Work, and shall in no way affect Contractor's independent contractor status as described herein.

§ 3.3.6 The Contractor shall review contractor safety programs, procedures, and precautions in connection with performance of the Work. However, the Contractor's duties shall not relieve any Subcontractor(s) or any other person or entity (e.g. a supplier) including any person or entity with whom the Contractor does not have a contractual relationship, of their responsibility or liability relative to compliance with all applicable federal, state and local laws, rules, regulations, and ordinances which shall include the obligation to provide for the safety of their employees, persons, and property and their requirements to maintain a work environment free of recognized hazards. The foregoing notwithstanding, the requirements of this Section are not intended to impose upon the Contractor any additional obligations that the Contractor would not have under any applicable state or federal laws including, but not limited to, any rules, regulations, or statutes pertaining to the Occupational Safety and Health Administration.

§ 3.3.7 Contractor acknowledges that the Work may be performed in connection with an educational facility which is currently occupied and in use. It is imperative that Contractor's operations and the performance of the Work not interfere with, interrupt, disturb, or disrupt Owner's normal operations or facilities. Contractor agrees to and shall comply with all rules, regulations and requirements of the Owner and the school campus on which the Work is to be performed, and shall take all steps necessary to protect and guard the safety of the employees, students and invitees of Owner. Contractor shall exercise the utmost skill and judgment to ensure that continuing construction activity will not interfere with the use, occupancy and quiet enjoyment of facilities in use on the site. Contractor recognizes that the ongoing activities in proximity with its construction activities shall result in the need for prompt and effective coordination of its services with those involved in the ongoing utilization of the premises. Such coordination and adequate site access shall be the responsibility of Contractor. Contractor understands and accepts the difficulties and costs associated with working in an existing facility and the potential delays and disruptions in its Work and has included such items in the Contract Time and the Contract Sum. The Contractor shall perform all the Work in such a manner as to cause minimum interference with the operations of the Owner and other contractors and Subcontractors on the site, and shall take, and cause the Contractor's and its Subcontractor's employees, agents, licensees and permittees to take all necessary precautions to protect the Work and the site and all persons and property thereon from damage or injury.

§ 3.3.8 Representatives of the Owner, Contractor, and Architect shall meet periodically at mutually agreed upon intervals, for the purpose of establishing procedures to facilitate cooperation, communication, and timely responses among the participants. By participating in this arrangement, the parties do not intend to create additional contractual obligations or modify the legal relationships which may otherwise exist.

§ 3.3.9 The Contractor shall pay fees for public or private water, gas, electrical and other utility service at the site until Substantial Completion of the Work. In the event that the Work will be conducted at an Owner site, where utility services are existing on site and reasonably accessible to the Contractor, the Owner may elect, in writing, to provide and pay for utility service for the Project site. Agreement to pay for such utility service shall not absolve the Contractor from using utilities judiciously in connection with its performance of the Work. In all cases, the Contractor shall secure and arrange for all necessary utility connections.

§ 3.3.10 The Owner may require that the Contractor use and/or respond to certain Owner-furnished forms or inquiries during the course of the Project. From time to time, there may be future revisions, changes, additions or deletions to these forms. The fact that the Owner modifies and increases reasonable reporting requirements shall not serve as the basis for a claim for additional time or compensation by the Contractor.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for qualified, careful, and efficient workers and labor, eligible to work in accordance with state and federal law. Contractor shall appropriately classify all workers in accordance with the Fair Labor Standards Act, its implementing regulations, and Texas Labor Code Section 214.008. In addition, unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for materials, equipment, tools, construction equipment and machinery, water, heat, utilities,

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transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Before ordering any material or doing any Work, Contractor shall verify all dimensions and check all conditions in order to assure Contractor that they are the same as those in the Drawings, Specifications, and other Construction Documents. Any inconsistency shall be brought to the attention of the Architect. In the event that discrepancies occur between ordered material and actual conditions and Architect was not notified beforehand, then costs to correct such discrepancies shall be borne by Contractor. In accordance with Texas Government Code §2269.054, these Contract Documents shall not be construed to deny or diminish the right of any person to work because of the person's membership or other relationship status with respect to any organization. In accordance with Texas Government Code §2269.0541, these Contract Documents shall also not prohibit, require, discourage or encourage a person, or discriminate against a person bidding on this contract from entering into or declining to enter into, or adhering to, an agreement with a collective bargaining organization relating to this Project.

(Paragraph deleted)

§ 3.4.2 Prevailing Wages

§ 3.4.2.1 The Project is subject to the Texas Government Code, Chapter 2258, Prevailing Wage Rates. This statute requires the Contractor and any Subcontractor to pay not less than the prevailing rates of per diem wages in the locality at the time of construction to all laborers, workmen, and mechanics employed by them in the execution of the contract.

§ 3.4.2.2 In accordance therewith, the Owner has established a scale of prevailing wages which is incorporated in the Project specifications, and not less than this established scale must be paid on the Project. Any workers not included in the schedule shall be properly classified and paid not less than the rate of wages prevailing in the locality of the Work at the time of construction.

§ 3.4.2.3 A Contractor or Subcontractor who violates the provisions of Sections 3.4.2.1 or 3.4.2.2 shall pay to Owner the sum of Sixty Dollars and No/100 ($60.00) for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rate stipulated in the scale of prevailing wages applicable to this Project, as required by Texas Government Code Section 2258.023(b).

§ 3.4.3 Substitutions

§ 3.4.3.1 If the Contract Documents (including the Instructions to Proposers and /or Offerors) specifically permit the submission by Contractor of requests for substitutions, Contractor may, within thirty (30) days after the Contract has been executed, make written request for the substitution of products in place of those specified in the Contract Documents to the Owner and the Architect. Any request for substitution shall be submitted to the Architect in writing, with appropriate shop drawings, product data, and certified test results substantiating the proposed product equivalence as required by this Section 3.4.3.1 and Section 3.4.3.2 and will be rejected if not so submitted.

§ 3.4.3.2 The Contractor must submit to the Architect and the Owner (i) a full explanation of the proposed substitution and submittal of all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other information necessary for a complete evaluation of the substitution; (ii) a written explanation of the reasons the substitution is necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable; (iii) the adjustment, if any, in the Contract Sum; (iv) the adjustment, if any, in the time of completion of the Contract and any modifications to the construction schedule; and (v) an affidavit stating that (a) the proposed substitution confirms to and meets all the requirements of the pertinent Specifications and the requirements shown on the Drawings, (b) the Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect; (c) the cost breakdown presented with Contractor's request is complete and includes all related costs, except for the Architect's redesign costs, if any, and waives all claims for additional costs related to the substitution which subsequently become apparent;(d) that the Contractor will coordinate and supervise the installation of the proposed substitute, making such changes as may be required for the Work to be complete in all respects; and (e) the Contractor will reimburse the Owner and for review or redesign services associated with any re-approval by applicable governmental authorities related to the substitution.

§ 3.4.3.3 By making requests for substitutions pursuant to Section 3.4.3 (and all subsections), the Contractor represents and certifies that: (1) Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to the product specified; (2) Contractor will provide the same warranty for the substitution product that the Contractor would have provided for the product specified; (3) the cost breakdown

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presented with the request is complete and includes all related costs, except for the Architect's redesign costs, if any, and waives all claims for additional costs related to the substitution which subsequently become apparent; (4) Contractor will coordinate and supervise the installation of the proposed substitute, making such changes as may be required for the Work to be complete in all respects; and (5) will reimburse Owner and Architect for review or redesign services associated with any re-approval by applicable governmental authorities related to the substitution.

§ 3.4.3.4 Owner and the Architect may accept or reject any such request for substitution in their sole discretion, based on cost, time, or other considerations. Requests for substitutions submitted after such thirty (30) day period will not be considered unless a product becomes impossible to obtain due to circumstances beyond the Contractor's control.

§ 3.4.3.5 Regardless of acceptance or rejection of substitution, the Contractor shall be responsible for amounts paid by the Owner to the Architect, to evaluate the Contractor's proposed substitutions and any amounts paid to the Architect to make agreed upon changes in the Specifications and Drawings made necessary by the Owner's acceptance of such substitutions. The Owner shall be entitled to deduct such amounts from the Contract Sum.

§ 3.4.4 Responsibility for Subcontractors

§ 3.4.4.1 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. Contractor, its subcontractors and vendors shall bear responsibility for compliance with all federal, state and local laws, regulations, guidelines, and ordinances pertaining to worker safety and applicable to the Work. Contractor further recognizes that the Owner and Architect do not owe the Contractor any duty to supervise or direct his work so as to protect the Contractor from the consequences of his own conduct. THE CONTRACTOR RELEASES, INDEMNIFIES AND HOLDS HARMLESS THE OWNER FOR CONTRACTOR'S FORCES; NON-COMPLIANCE WITH OWNER'S DRUG-FREE, ALCOHOL-FREE, WEAPON-FREE, HARASSMENT-FREE, AND TOBACCO-FREE ZONES; CONTRACTOR'S FORCES NON-COMPLIANCE WITH CRIMINAL LAW; OR CONTRACTOR'S OR CONTRACTOR'S FORCES NON-COMPLIANCE WITH IMMIGRATION LAW OR REGULATIONS. Any individual found by Owner to have violated these restrictions is subject to permanent removal from the Project, at Owner's request. Contractor shall place similar language in its subcontract agreements, requiring its Subcontractors and Sub-subcontractors to be responsible for their own forces and Contractor shall cooperate with the Owner to ensure Subcontractor and Sub-subcontractor compliance.

§ 3.4.4.2 The Contractor shall only employ or use labor in connection with the Work capable of working harmoniously with all trades, crafts, and any other individuals associated with the Project. The Contractor shall be responsible for the actions of Contractor's forces, Subcontractor's forces and all tiers of Sub-subcontractor's forces. The Contractor recognizes that the Work may be performed in connection with an operational educational facility or the Project site may be adjacent to a public-school campus. It is imperative that Contractor's operations and the performance of the Work not interfere with, interrupt, disturb or disrupt Owner's normal operations or facilities. Contractor shall exercise the utmost skill and judgment to ensure that continuing construction activity will not interfere with the use, occupancy and quiet enjoyment of facilities in use on the site. Contractor recognizes that the ongoing activities in proximity with its construction activities shall result in the need for prompt and effective coordination of its services with those involved in the ongoing utilization of the premises. Such coordination and adequate site access shall be the responsibility of Contractor. Contractor understands and accepts the difficulties and costs associated with working at or near an operational campus and the potential delays and disruptions in its Work and has included such items in the Contract Time and the Contract Sum.

§ 3.4.5 Criminal History Records Checks

§ 3.4.5.1 Prior to the commencement of work, Contractor shall take all necessary steps to comply with Texas Education Code, Section 22.0834 by obtaining, if a Qualified Contractor, as defined, or arranging with Owner to obtain, if not a Qualified Contractor, national criminal history record information ("CHRI") as to Contractor and Subcontractors and all persons associated with them including their employees, agents and representatives who a) have or will have continuing duties related to the contracted services; and b) have or will have direct contact with students (each a "Covered Employee").

§ 3.4.5.2 If the Contractor or any Subcontractor determines that § 3.4.5.1 does not apply to an employee, the Contractor or Subcontractor shall make a reasonable effort to ensure that the conditions or precautions that resulted in the determination that § 3.4.5.1 did not apply to the employee continue to exist throughout the time that the contracted services are provided.

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§ 3.4.5.3 The requirements of § 3.4.5.1 do not apply if:

.1 the public work does not involve the construction, alteration, or repair of an Instructional Facility as defined by Section 46.001, Texas Education Code (real property, an improvement to real property, or a necessary fixture of an improvement to real property that is used predominantly for teaching the curriculum required by the Texas Education Code);

.2. for public work that involves construction of a new Instructional Facility, the person's duties related to the contracted services will be completed not later than the seventh (7th) day before the first day the facility will be used for instructional purposes; or

.3 for a public work that involves an existing Instructional Facility:

(a) the public work area contains sanitary facilities and is separated from all areas used by students by a secure barrier fence that is not less than six feet in height; and

(b) the Contractor adopts a policy prohibiting employees, including subcontractor entity employees, from interacting with students or entering areas used by students, informs employees of the policy, and enforces the policy at the public work area.

§ 3.4.5.4 If the Contractor is not a Qualified School Contractor, a person to whom § 3.4.5.1 applies must submit to a CHRI review by the Owner.

§ 3.4.5.5 Owner and Contractor agree to destroy any CHRI obtained or indexed by the Federal Bureau of Investigation ("FBI") or Texas Department of Public Safety ("DPS") under this § 3.4.5 after the information is used for its authorized purpose. CHRI may only be released to the individual who is the subject of the information, by court order, or as allowed by law.

§ 3.4.5.6 Any Covered Employee that has during the preceding thirty (30) years, (a) been convicted of or placed on deferred adjudication community supervision for an offense for which a defendant is required to register as a sex offender under Chapter 62, Code of Criminal Procedure; or (b) been convicted of a felony offense under Title 5, Texas Penal Code if the victim of the offense was under 18 years of age at the time the offense was committed; (c) been convicted of an equivalent offense to (a) or (b) under federal law or the laws of another state ("Disqualifying Criminal History"); shall be disqualified and prohibited from performing any contract duties or services and neither the Contractor nor its Subcontractor may permit such person to provide services at an Instructional Facility. If a Covered Employee is determined by the Owner's review of the CHRI to have a Disqualifying Criminal History, Contractor will exclude that person from assignment to the Project. To the extent the Owner, not the Contractor obtains the CHRI described in this § 3.4.5, Contractor understands that it will not have access to the results of such criminal history records check, based on statewide regulations beyond the control of the Owner, and agrees to rely solely on the judgment of the Owner as to whether the Covered Employee must be excluded from the Project.

§ 3.4.5.7 Prior to commencement of its work on the Project the Contractor will provide written certification to the Owner that either: (1) Contractor and its Subcontractors of every tier, do not have any Covered Employees, as defined; (2) Contractor and its Subcontractors of every tier are otherwise exempt from compliance with the requirements contained herein; or (3) Contractor and its Subcontractors of every tier have complied with the statutory and contractual requirements of this Agreement as of that date.

§ 3.4.5.8 Contractor agrees that if it receives information that a Covered Employee is arrested or convicted for any of the Disqualifying Criminal History offenses, during the performance of the Work, Contractor will immediately remove the Covered Employee from Owner's property or other location where students are regularly present, and notify the Owner of said removal within three (3) days of doing so. Contractor understands that any failure to comply with the requirements of this section may be grounds for termination of this Agreement by Owner, in accordance with Article 14, Termination.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. The Contractor further warrants that Contractor shall perform the Work in a good and workmanlike manner, continuously and diligently in

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accordance with all applicable codes, generally accepted standards of construction practice for construction of projects similar to the Project. All materials shall be installed in a true and straight alignment, level and plumb; patterns shall be uniform; and jointing of materials shall be flush and level, unless otherwise directed in writing by the Architect. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. No acceptance or payment by the Owner shall constitute a waiver of the foregoing and nothing herein shall exclude or limit any warranties implied by law. The warranties provided in this Section 3.5.1 are in addition to, and not in limitation of, any other warranties, remedies and/or guaranties set out in the Contract Documents or under applicable law. Furthermore, the Contractor's warranty period shall be for one (1) year from the date of Final Completion with exception to other extended warranties that may be applicable to the Project identified within the Project requirements.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.5.3 Contractor acknowledges that the Project may involve construction work on more than one (1) building for the Owner. In such case, each building, or approved phase of each building, may have its own, separate, and independent date of Substantial Completion (or, for Work to be completed or corrected after the date of Substantial Completion, the Warranty Commencement Date). Contractor shall maintain a complete and accurate schedule of the date(s) of Substantial Completion, the date(s) of Final Completion, and the dates upon which the warranties under granted in the Contract Documents will expire, on each phase or building and will provide a copy of such Schedule to the Owner, as required in Subsection 3.5.6, as a condition precedent to Final Payment.

§ 3.5.4 When deemed necessary by the Owner and prior to installation of any item specifically made subject to a performance standard or regulatory agency standard under any provision of the Contract Documents, Contractor shall furnish proof of conformance to the Architect. Proof of conformance shall be in the form of an affidavit from the manufacturer certifying that the item is in conformance with the applicable standards; an affidavit from a testing laboratory certifying that the product has been tested within the past year and is in conformance with the applicable standards; or such further reasonable proof as is required by the Architect.

§ 3.5.5 The Contractor agrees to assign to the Owner at the time of Final Completion of the Work any and all manufacturer's warranties relating to equipment, machinery, materials, equipment or components and labor incorporated into the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties. Contractor shall take no action or fail to act in any way which results in the termination or expiration of such third-party warranties or which otherwise results in prejudice to the rights of Owner under such warranties. Contractor agrees to provide all notices required for the effectiveness of such warranties and shall include provisions in the contracts with the providers and manufacturers of such systems and equipment whereby Owner shall have a direct right, but not a duty, of enforcement of such warranty obligations. The warranties provided in this Section 3.5 or otherwise provided in the Contract Documents or by law, shall in no way limit or abridge the warranties provided by the suppliers of equipment and systems which are to comprise a portion of the Work. A complete set of all warranties required from contractors, manufacturers, or suppliers as appropriate, on the manufacturer's or supplier's approved forms, executed by Contractor as required, with a Warranty Commencement Date noted as required, and in the form required by Subparagraph 3.5.6 shall be submitted to the Architect for delivery to the Owner, as a condition precedent to Final Payment.

§ 3.5.6 Prior to receipt of Final Payment, Contractor shall: (1) obtain duplicate original warranties, executed by all subcontractors, and the warranties of suppliers and manufacturers, noting the Warranty Commencement Date on the face of each; (2) verify that the documents are in proper form and contain full information; (3) Co-sign warranties when required; (4) bind all warranties in commercial quality 8-1/2 X 11 inch three-ring binder, with hardback, cleanable, plastic covers; (5) label the cover of each binder with a typed or printed title labeled "WARRANTIES", along with the Title of the Project; name, address and telephone number of Contractor; and name of its responsible principal; (6) include a Table of Contents, with each item identified by the number and title of the specification section under which the product is specified; (7) include the Schedule of Warranty Commencement Dates required by Subparagraph 3.5.3; (8) separate each warranty with index tab sheets keyed to the Table of Contents listing; and (8)

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deliver warranties in the form described in this Subparagraph 3.5.6, to the Architect for review same prior to submission to the Owner.

§ 3.6 Taxes

The Contractor shall not include in the Contract Price or any Modification any amount for sales, use, or similar taxes for which (1) a Texas independent school district is exempt, and (2) the Owner has provided the Contractor with a tax exemption certificate or other documentation necessary to establish the Owner's exemption from such taxes. **CONTRACTOR HEREBY RELEASES, INDEMNIFIES, AND HOLDS HARMLESS OWNER FROM ANY AND ALL CLAIMS AND DEMANDS MADE AS A RESULT OF THE FAILURE OF CONTRACTOR OR ANY SUBCONTRACTOR TO COMPLY WITH THE PROVISIONS OF ANY OR ALL SUCH LAWS AND REGULATIONS.**

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time proposals are received or negotiations concluded. The Owner shall be responsible for payment of TDLR Texas Accessibility submissions and inspection costs.

§ 3.7.2 In performing its obligations hereunder, the Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work and upon request by the Owner or Architect shall furnish evidence, satisfactory to the Owner, of such compliance.

§ 3.7.3 If the Contractor performs Work when Contractor knows or reasonably should have known it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, the Contract Documents, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction. **THE CONTRACTOR AGREES TO INDEMNIFY, DEFEND AND HOLD HARMLESS THE OWNER, ITS TRUSTEES, OFFICERS, REPRESENTATIVES, AGENTS AND EMPLOYEES FROM AND AGAINST ALL THIRD-PARTY CLAIMS, FINES, PENALTIES, OR LIABILITIES FROM, ARISING OUT OF, OR BASED UPON CONTRACTOR'S VIOLATION OF ANY LAWS, ORDINANCES, RULES, REGULATIONS, ORDERS OR DECREES.**

(Paragraphs deleted)

§ 3.7.4 Claims for Concealed or Unknown Conditions

Contractor acknowledges that there may exist at the Project site certain soil and geological conditions and/or surface physical conditions which are not disclosed in the Contract Documents, and which have been known to or may be reasonably anticipated to occur in the area or be related to any past use of the Project site, including, without limitation, the presence of rock and its hardness, geologic formations, differing soils, and surface structures, equipment or other impediments, either natural or man-made (collectively, "Subsurface Conditions"). Owner makes no representations or warranties regarding Subsurface Conditions at the Project site, or of the accuracy or continuity of conditions which may be noted in any reports furnished or made available to Contractor. Contractor covenants and agrees that any such reports are furnished or made available by Owner to Contractor for information purposes only, and Contractor acknowledges that Owner is not responsible for the content thereof. Contractor shall be responsible for inspecting the site and determining the existence or likelihood of any Subsurface Conditions which may affect the Contract Time or the Contract Sum, or both. The Contract Time and the Contract Sum contained herein (as proposed by Contractor), or GMP as applicable, shall be deemed to include all costs of and sufficient time to complete all Work associated with or attributable to Subsurface Conditions, and Contractor shall not be entitled to submit a claim for or to obtain an extension of the Contract Time or increase in the Contract Sum due to the existence of Subsurface Conditions. Except as provided above with respect to Subsurface Conditions, if the Contractor encounters conditions at the site that are subsurface or otherwise concealed physical conditions which were not known to the Contractor, and that differ materially from those indicated in the Contract Documents the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed, and in no event later than three (3) days after first observance of the conditions and report its findings to the Owner and Architect.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall

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continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Time arising from the existence of such remains or features may be made as provided in Article 15. In accordance with the terms of this Agreement, there will be no adjustment to the Contract Sum for delay arising out or related to the circumstances described in this Section 3.7.5.

§ 3.7.6 The Contractor shall also obtain all permits and approvals, and pay all fees and expenses, if any, associated with National Pollutant Discharge Elimination System (NPDES) regulations administered by the Environmental Protection Agency (EPA) and local authorities, if applicable, that require completion of documentation and/or acquisition of a "Land Disturbing Activities Permit" for the Project. Contractor's obligations under this Section do not require it to perform engineering services during the pre-construction phase to prepare proper drainage for the construction sites. However, any drainage alterations made by Contractor during the construction process which require the issuance of a permit shall be at Contractor's sole cost.

§ 3.7.7 The Contractor shall certify in writing that no materials used in the Work contain lead or asbestos materials in them in excess of amounts allowed by Local/State standards, laws, codes, rules and regulations; the Federal Environmental Protection Agency (EPA) standards and/or the Federal Occupational Safety and Health Administration (OSHA) standards, whichever is most restrictive. The Contractor shall provide this written certification as part of submittals under the Section in the Instruments of Service related to Contract Closeout.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- **.1** allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner within such time as is reasonably specified by the Contractor as necessary to avoid delay in the Work.

§ 3.8.4 When performing Work under Allowances, where reasonably possible, Contractor shall solicit and receive no fewer than three (3) written proposals and shall provide the Work on the basis of the best value for the Owner, as directed by the Architect following Owner's written approval of the cost proposal.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. The Contractor shall not replace the Superintendent prior to Final Completion of the Work unless (1) the Superintendent shall cease to be employed by the Contractor or its subsidiaries or affiliated companies, or (2) the Owner agrees to such replacement. The Superintendent may not be employed on any other project prior to Final Completion of the Work. From Substantial Completion to Final Completion, the Superintendent shall be on-site as necessary to ensure that Final Completion occurs within thirty (30) days of Substantial Completion.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish a list to the Architect a list of all engineers, consultants, job-site superintendents, subcontractors and suppliers involved in construction. The Architect shall provide such information to the Owner. The Owner shall have the right, at any time, to require a change in any engineer, consultant, job-site superintendent, subcontractor or supplier if their performance is deemed unsatisfactory in its sole discretion.

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§ 3.9.3 The Contractor shall provide an adequate staff for the proper coordination and expedition of the Work. Owner reserves the right to require Contractor to dismiss from the Work any employee or employees that Owner may deem incompetent, careless, insubordinate, or in violation of any provision in these Contract Documents. This provision is applicable to Subcontractors, Sub-subcontractors and their employees.

§ 3.9.4 Owner shall be notified as soon as Contractor becomes aware, but in no event fewer than twenty-four (24) hours before the time of that the Superintendent is required to be present at the site, that the Superintendent will not be present at the site for any reason, except illness. If the reason is due to illness, then Owner shall be notified as soon as the Contractor obtains the information, but in no event later than the beginning of the day that the Superintendent will be absent from the site. In such event of such absence, the Contractor will designate a person as acting superintendent and Contractor promptly notify the Owner of the identity and contact information for the designated acting superintendent.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work, utilizing critical path method scheduling techniques. The Schedule shall not exceed the time limits set forth in the Contract Documents. The Schedule shall thereafter be updated on a monthly basis and submitted with each Application For Payment. The receipt of an updated schedule with each Application For Payment shall be a condition precedent to the Owner's duty to make any payment pursuant to Article 9.6. The schedule shall not interfere with the operation of Owner's existing facilities and operations without Owner's prior written approval.

§ 3.10.1.1 Each Schedule shall: (1) break the work into a sufficient number of activities to facilitate the efficient use of critical path method scheduling by the Contractor, Owner, and Architect and shall assign each scheduled activity a cost value consistent with the Schedule of Values so as to allow the Owner and Contractor to project cash flow for the Project; (2) include activates representing manufacturing, fabrication, or ordering lead time for materials, equipment or other items for which the Architect is required to review submittals, shop drawings, product data, or samples; (3) with the exception of the initial schedule, shall indicate the activities, or portions thereof, which have been completed; (4) shall reflect the actual time for completion of such activities, and shall reflect any changes to the sequence or planned duration of all activities.

§ 3.10.1.2 If any updated Schedule exceeds the time limits set forth in the Contract Documents for completion of the Work, the Contractor shall include with the updated Schedule, a statement of the reasons for the anticipated delay in completion of the Work and the Contractor's planned course of action for completing the Work within the time limits set forth in the Contract Documents. If the Contractor asserts that the failure of the Owner or the Architect to provide information to the Contractor is the reason for anticipated delay in completion, the Contractor shall also specify what information is required from the Owner or Architect and documentation of the date such information was requested.

§ 3.10.1.3 Neither the Owner or the Contractor shall have exclusive ownership of float time in the schedule, and all float time shall inure to the benefit of the Project. The Contractor agrees to use its best efforts not to sequence the Work or assign activity durations so as to produce a schedule in which more than one-fourth of the remaining activities have no float time.

§ 3.10.1.4 Upon review and acceptance by the Owner and the Architect of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents. If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted for acceptance. Submission of any schedule under this Contract constitutes a representation by the Contractor that: (1) the schedule represents the sequence in which the Contractor intends to prosecute the remaining Work; (2) the schedule represents the actual sequence and durations used to prosecute the completed Work; (3) that to the best of its knowledge and belief the Contractor is able to complete the remaining Work in the sequence and time indicated; and, (4) that the Contractor intends to complete the remaining Work in the sequence and time indicated.

§ 3.10.1.5 The Contractor shall recommend to the Owner and to the Architect a schedule for procurement of long-lead time items which will constitute part of the Work as required to meet the Project schedule. If such long-lead time items are procured by the Owner, they shall be procured on terms and conditions as recommended by the Contractor. Upon the Owner's acceptance of the Contractor's Stipulated Sum proposal or Guaranteed Maximum Price, as applicable, all contracts previously entered into by Owner shall be assigned by Owner to the Contractor who shall accept

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responsibility for such contracts as if it had initially entered into such contracts. Contractor shall expedite the delivery of long-lead time items. The Contractor shall receive and protect all Owner supplied material.

§ 3.10.1.6 The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The accepted construction schedule shall be updated to reflect actual conditions.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect and shall attend progress meetings at the Project Site, in such frequency as are acceptable to the Owner. Progress of the work shall be reported at said meetings with reference to Contractor's construction schedule.

§ 3.10.4 The Contractor shall submit to the Architect with each monthly application for payment a copy of the progress schedule showing all modifications required, and shall take whatever corrective action is necessary to assure that the project completion schedule is met at no additional cost to Owner, except as allowed herein.

§ 3.10.4 Correction of Delay.

§ 3.10.4.1 In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, or any Milestone Date unless any such adjustment is submitted by the Contractor as a Claim in compliance with Article 15 or the adjustment is otherwise agreed to in a written confirmation from the Owner and documented by written Change Order.

§ 3.10.4.2 If at any time the Owner determines that the performance of the Work has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitations, (i) working additional shifts of overtime, (ii) supplying additional manpower, equipment and facilities, and (iii) other similar measures (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the construction schedule. The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Owner under or pursuant to this Subparagraph 3.10.4. The Owner may exercise the rights furnished the Owner under or pursuant to this Subparagraph 3.10.4 as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with any Milestone Date or completion date set forth in the Contract Documents.

§ 3.10.4.3 In the event Contractor determines that the Scheduled Completion Date cannot be met by resequencing the Work, then Contractor shall immediately provide to the Owner, and in any event within seven (7) days after the date of receipt of any request by Owner for resequencing or acceleration, a plan to complete the Work in the shortest possible time. No approval by the Owner of any plan for resequencing or acceleration of the Work submitted by Contractor pursuant to this paragraph shall constitute a waiver by Owner of any damages or losses which Owner may suffer by reason of such resequencing or the failure of Contractor to meet the Scheduled Completion Date.

§ 3.11 Documents and Samples at the Site

The Contractor shall maintain and make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, field test records (including environmental inspection and test records), inspection certificates or records, manufacturers' certificates. The Documents to be maintained shall be kept in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner or their respective representatives, and

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delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. Specific dimensions, quantities, installation and performance of equipment and systems in compliance with the Construction Documents and the Contract Documents remain the Contractor's responsibility.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect, in writing, of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

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§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Contractor represents and warrants that all shop drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the shop drawings are prepared and, if required by the Architect or applicable law, by a licensed engineer The Owner and the Architect shall be entitled to rely upon the adequacy, completeness and accuracy of the services, certifications, and approvals performed or provided by such design professionals. Pursuant to this Section 3.12.10.1, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. A registered architect must prepare plans and specifications for all the Work, as governed by the Texas Occupations Code Chapter 1051; and a registered engineer must prepare plans, specifications and estimates for all Work governed by Texas Occupations Code Chapter 1001. In the event that Contractor retains a licensed design professional under the terms of this paragraph, Contractor shall require that the licensed design professional carry commercial general liability and errors and omissions insurance coverage in the same amounts and forms as required of the Architect on this Project. In the event that the licensed design professional retained by the Contractor will be conducting on-site services or observations, the licensed design professional shall also carry worker's compensation insurance and comprehensive automobile liability in the same amounts and forms as required of the Architect on this Project.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.12.10.3 The Architect's review of Contractor's submittals will be limited to one examination of an initial submittal and one (1) examination of a resubmittal. The Architect's review of additional submittals will be made only with the consent of the Owner after notification by the Architect. The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for evaluation of such additional resubmittals.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The Contractor shall so conduct its operations as not to unreasonably interfere with traffic on public thoroughfares adjacent or near to the Project site.

§ 3.13.2 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction material and equipment stored at the Project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.

§ 3.13.3 Without prior approval of the Owner, the Contractor shall not permit any workers to use any of Owner's existing facilities at or adjacent to the Project site, including, without limitation, lavatories, toilets, entrance and parking areas other than those designated by the Owner. The Contractor shall comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and Owner's Buildings.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly, provided, however, that any such cutting, fitting or patching can only be performed if the cutting, fitting or patching results in Work that is in accordance with the Contract Documents. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by

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excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall, on a daily basis, keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. Contractor shall provide on-site containers for the collection of waste materials, debris and rubbish, and shall periodically remove waste materials, debris and rubbish from the Work and dispose of all such materials at legal disposal areas away from the site. All cleaning operations shall be scheduled so as to ensure that contaminants resulting from the cleaning process will not fall on newly-coated or newly-painted surfaces. Immediately after unpacking materials, all packing case lumber or other packing materials, wrapping or other like flammable waste shall be collected and removed from the building and premises. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project. Prior to the Architect's inspection for Substantial Completion, the Contractor shall clean exterior and interior surfaces exposed to view; remove temporary labels, stains, putty, soil, paint and foreign substances from all surfaces, including glass and painted surfaces; polish transparent and glossy surfaces; clean equipment and fixtures to a sanitary condition; replace air filters in mechanical equipment; clean roofs, gutters, and downspouts; remove obstructions and flush debris from drainage systems; clean site; sweep paved areas and rake clean other surfaces; remove trash and surplus materials from the site; clean and polish all floors; clean and polish all hardware; and repair all Work damaged during cleaning and replace any damaged or broken glass.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor. Such reimbursement amounts may be deducted from Contractor's Final Payment Application.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Architect and their designated representatives, with access to the Work in preparation and progress wherever located. The presence of the Owner, Architect or their representatives does not constitute acceptance or approval of the Work. Upon request of the Architect or Owner, the Contractor shall accompany the Architect or Owner on an inspection of the Work.

§ 3.17 Royalties, Patents and Copyrights

THE CONTRACTOR SHALL PAY ALL ROYALTIES AND LICENSE FEES. TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER, THE OWNER'S TRUSTEES, OFFICERS, AGENTS AND EMPLOYEES DEFEND AGAINST ANY AND ALL SUITS, CLAIMS, LAWSUITS, JUDGMENTS, COSTS, LIENS, LOSSES, EXPENSES, FEES (INCLUDING REASONABLE ATTORNEY'S FEES, AS PERMITTED BY STATUTE), PROCEEDINGS, ACTIONS, DEMANDS, CAUSES OF ACTION, LIABILITY FOR INFRINGEMENT OF COPYRIGHTS AND PATENT RIGHTS ALLEGED TO HAVE RESULTED FROM CONTRACTOR'S INFRINGEMENT, AND SHALL INDEMNIFY AND HOLD THE OWNER THE OWNER'S TRUSTEES, OFFICERS, AGENTS AND EMPLOYEES HARMLESS FROM LOSS ON ACCOUNT THEREOF, INCLUDING ATTORNEY'S FEES (AS PERMITTED BY STATUTE), BUT SHALL NOT BE RESPONSIBLE FOR DEFENSE OR LOSS WHEN A PARTICULAR DESIGN, PROCESS, OR PRODUCT OF A PARTICULAR MANUFACTURER OR MANUFACTURERS IS REQUIRED BY THE CONTRACT DOCUMENTS, OR WHERE THE COPYRIGHT VIOLATIONS ARE CONTAINED IN DRAWINGS, SPECIFICATIONS, OR OTHER DOCUMENTS PROVIDED BY THE OWNER OR PREPARED BY THE ARCHITECT. HOWEVER, IF AN INFRINGEMENT OF A COPYRIGHT OR PATENT ATTRIBUTABLE TO THE OWNER OR ARCHITECT, IS DISCOVERED BY, OR MADE KNOWN TO, THE CONTRACTOR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOSS UNLESS THE INFORMATION IS PROMPTLY FURNISHED TO THE OWNER AND THE ARCHITECT.

§ 3.18 Indemnification

§ 3.18.1 TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL INDEMNIFY, DEFEND (EXCEPT AS LIMITED BELOW) AND HOLD HARMLESS THE OWNER, THE OWNER'S TRUSTEES, OFFICERS, AGENTS AND EMPLOYEES (HEREINAFTER IN THIS SECTION 3.18 "OWNER"), FROM AND AGAINST ALL CLAIMS, DAMAGES, LOSSES, AND EXPENSES, (INCLUDING BUT NOT LIMITED TO REASONABLE ATTORNEY'S FEES, AS PERMITTED BY STATUTE), ARISING OUT OF OR

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RESULTING FROM PERFORMANCE OF THE WORK, PROVIDED THAT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY (OTHER THAN THE WORK ITSELF), INCLUDING THE LOSS OF USE RESULTING THEREFROM, CAUSED IN WHOLE OR IN PART BY THE WILLFUL, INTENTIONAL OR NEGLIGENT ACTS OR OMISSIONS OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THE CONTRACTOR, OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, REGARDLESS OF WHETHER OR NOT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS CAUSED IN PART BY THE OWNER. IF THE OWNER'S NEGLIGENCE IS A CONCURRENT CAUSE OF THE INJURY, DEATH, OR DAMAGE, CONTRACTOR'S OBLIGATION TO INDEMNIFY IS LIMITED TO THE AMOUNT NECESSARY TO CAUSE THE RELATIVE LIABILITY OF OWNER AND CONTRACTOR TO REFLECT THE COMPARATIVE NEGLIGENCE FINDINGS OF THE TRIER OF FACT (JUDGE OR JURY) OR AS AGREED IN A SETTLEMENT AGREEMENT TO WHICH OWNER AND CONTRACTOR ARE BOTH PARTIES. SUCH OBLIGATION SHALL NOT BE CONSTRUED TO NEGATE, ABRIDGE, OR REDUCE OTHER RIGHTS OR OBLIGATIONS OF INDEMNITY THAT WOULD OTHERWISE EXIST AS TO A PARTY OR PERSON DESCRIBED IN THIS SECTION 3.18.

§ 3.18.2 IN CLAIMS AGAINST ANY PERSON OR ENTITY INDEMNIFIED UNDER THIS SECTION 3.18 BY AN EMPLOYEE OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THEM, OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, THE INDEMNIFICATION OBLIGATION UNDER SECTION 3.18.1 SHALL NOT BE LIMITED BY A LIMITATION ON AMOUNT OR TYPE OF DAMAGES, COMPENSATION, OR BENEFITS PAYABLE BY OR FOR THE CONTRACTOR OR A SUBCONTRACTOR UNDER INSURANCE POLICIES, WORKERS' COMPENSATION ACTS, DISABILITY BENEFIT ACTS, OR OTHER EMPLOYEE BENEFIT ACTS.

§ 3.18.3 THE DUTY TO DEFEND SET OUT ABOVE SHALL NOT APPLY IN THE EVENT THAT THE CLAIM IS BASED, IN WHOLE OR IN PART, ON THE NEGLIGENCE OF, FAULT OF, OR BREACH OF CONTRACT BY THE OWNER. NOTWITHSTANDING THE FOREGOING, THE CONTRACTOR AGREES TO REIMBURSE THE OWNER'S REASONABLE ATTORNEY'S FEES IN PROPORTION TO THE CONTRACTOR'S LIABILITY.

§ 3.18.4 CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL HOLD OWNER FREE AND HARMLESS FROM LIABILITY RESULTING FROM LOSS OF OR DAMAGE TO CONTRACTOR'S OR ITS SUBCONTRACTORS' CONSTRUCTION TOOLS AND EQUIPMENT AND RENTED ITEMS WHICH ARE USED OR INTENDED FOR USE IN PERFORMING THE WORK, REGARDLESS OF WHETHER SUCH LOSS OR DAMAGE IS CAUSED IN WHOLE OR IN PART BY THE WILLFUL, INTENTIONAL OR NEGLIGENT ACTS OR OMISSIONS OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THE CONTRACTOR, OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, REGARDLESS OF WHETHER OR NOT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS CAUSED IN PART BY THE OWNER. IF THE OWNER'S NEGLIGENCE IS A CONCURRENT CAUSE OF THE INJURY, DEATH, OR DAMAGE, CONTRACTOR'S OBLIGATION TO INDEMNIFY IS LIMITED TO THE AMOUNT NECESSARY TO CAUSE THE RELATIVE LIABILITY OF OWNER AND CONTRACTOR TO REFLECT THE COMPARATIVE NEGLIGENCE FINDINGS OF THE TRIER OF FACT (JUDGE OR JURY) OR AS AGREED IN A SETTLEMENT AGREEMENT TO WHICH OWNER AND CONTRACTOR ARE BOTH PARTIES. THIS PROVISION SHALL APPLY, WITHOUT LIMITATION, TO LOSS OR DAMAGE OCCURRING AT THE WORK SITE OR WHILE SUCH ITEMS ARE IN TRANSIT TO OR FROM THE WORK SITE AND IS IN ADDITION TO CONTRACTOR'S OBLIGATIONS UNDER SECTION 3.18.1.

§ 3.18.5 The indemnification hereunder shall include, without limiting the generality of the foregoing, liability which could arise to the Owner pursuant to State statutes for the safety of workmen and in addition, all Federal statutes and rules existing thereunder for protection, occupational safety and health to workmen. It being agreed that the primary obligation of the Contractor is to comply with said statutes in performance of the Work by Contractor and that the obligations of the Owner under said statutes are secondary to that of the Contractor.

§ 3.18.6 It is agreed with respect to any legal limitations now or hereafter in effect and affecting the validity or enforceability of the indemnification obligations under Section 3.18, such legal limitations are made a part of the indemnification obligation and shall operate to amend the indemnification obligation to the minimum

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extent necessary to bring the provision into conformity with the requirements of such limitations, and as so modified, the indemnification obligations shall continue in full force and effect.

§ 3.18.7 Contractor shall promptly advise the Owner, in writing, of any claim or demand against the Owner or Contractor, known to the Contractor related to or arising out of Contractor's activities under this Contract.

§ 3.18.8 The provisions in Section 3.18 in its entirety shall survive the completion, termination or expiration of this contract and are solely for the benefit of the parties hereto and not intended to create or grant any rights, contractual or otherwise, to any other person or entity.

§ 3.19 Representations And Warranties

§ 3.19.1 The Contractor represents and warrants the following to the Owner (in addition to the other representations and warranties contained in the Contract Documents), as an inducement to the Owner to execute this Contract, which representations and warranties shall survive the execution and delivery of the Contract and the Final Completion of the Work:

- **.1** that it is financially solvent, able to pay its debts as they mature and possessed of sufficient working capital to complete the Work and perform its obligations under the Contract Documents;
- **.2** that it is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder and has sufficient experience and competence to do so;
- **.3** that it is authorized to do business in the State where the Project is located and properly licensed by all necessary governmental and public quasi-public authorities having jurisdiction over it and over the Work and the site of the Project;
- **.4** that the execution of the Contract and its performance thereof is within its duly authorized powers; and
- **.5** that its duly authorized representative has visited the site of the Work, familiarized itself with the local conditions under which the Work is to be performed and correlated its observations with the requirements of the Contract Documents.

§ 3.20 Business Standards

§ 3.20.1 Contractor, in performing its obligations under Contract, shall establish and maintain appropriate business standards, procedures, and controls, including those necessary to avoid any real or apparent impropriety or adverse impact on the interest of Owner or affiliates. Contractor shall review, with Owner, at a reasonable frequency during the performance of the Work hereunder, such business standards and procedures including, without limitation, those related to the activities of Contractor's employees and agents in their relations with Owner's employees, agents, and representatives, vendors, Subcontractors, and other third parties, and those relating to the placement and administration of purchase orders and contracts.

§ 3.21 Antitrust Violation

To permit the Owner to recover damages suffered in antitrust violations, Contractor hereby assigns to Owner any and all claims for overcharges associated with this Contract which violate the antitrust laws of the United States, 15 U.S.C.A. Section 1 et seq. The Contractor shall include this provision in its agreements with each subcontractor and supplier. Each subcontractor shall include such provisions in agreements with sub-subcontractors and suppliers.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner,

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date of the Owner's contract with the Architect terminates. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, or as they may be amended in the future.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with

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the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents, and delivered on time. In addition, the Architect or its structural consultant will (1) provide on-site observations prior to and during all concrete pours that contribute to the structural integrity of the building, including all pours of concrete piers, footings, grade beams, floor slabs, and concrete superstructure components, if applicable; and (2) provide on-site observations prior to covering up or closing up of portions of the construction which, if covered, would conceal problems with the structural integrity of the Project. Contractor shall not close or cover said Work until said observations have occurred. Contractor or Architect will advise Owner of the need for any third-party laboratory or testing services to assist the Architect and Owner.

§ 4.2.3 On the basis of the site observations, the Architect will keep the Owner informed about the progress and quality of the Work. The Architect shall promptly report to the Owner and Contractor orally regarding: (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. An oral notification of defects and deficiencies observed in the Work shall be followed by a notice in writing to the Owner and Contractor specifying the defect(s), non-conforming Work, deviations from the Contract Documents and corrective actions taken or recommended. The Architect shall not have control over or responsibility for the Contractor's construction means, methods, techniques, sequences, procedures, or safety programs and will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents, nor shall the Architect have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work. This does not, however, relieve Architect of Architect's responsibilities under this Agreement. Any services by Contractor made necessary by Contractor's construction defect or nonconforming Work shall be performed by the Contractor at no additional cost to Owner. In addition, the Contractor shall reimburse the Owner for compensation paid to the Architect (whether performed by the Architect or its Consultants) or the Owner's Consultants, for additional site visits made necessary by the fault, neglect, the request of the Contractor or made necessary by the Contractor's construction defect or nonconforming Work. Any amount subject to reimbursement under this Section may be required by Owner to be deducted from the next Payment Application submitted by the Contractor and any subsequent Payment Application until paid, and if any amount remains unpaid, the balance shall be paid by the Contractor as a condition to Final Payment.

§ 4.2.4 Communications

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters relating to the Contract and the Project. However, the Owner reserves the right to communicate directly with the Contractor and Subcontractors. Communication by and with the Architect's consultants shall be through the Architect. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, in accordance with the Contract Documents, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect or the Owner has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect or the Owner considers it necessary or advisable, the Architect or the Owner will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect or the Owner nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Owner to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work. Certain portions of the Work may be tested and/or observed at various stages, sometimes off the Project site, between initial observation or review and final positioning of the completed Work. Nothing in any initial or prior approval or test result shall prevent action to require conformance, if at any subsequent time the Work or any portion thereof is found not to conform to the requirements of the Contract Documents. Architect and/or Contractor shall promptly notify, the other party orally and in writing, and Owner of any perceived fault or defect in the design or nonconformance of the Work with the Construction Documents they may respectively discover and each, upon discovery of the defect or nonconformance, shall be responsible for notifying the

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other party and Owner of those corrective actions they respectively take; provided, however, Contractor shall have no duty to notify Owner of discoveries made or actions taken by Architect.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or Separate Contractors, and allow sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. If any submittal does not comply with the requirements of the Contract Documents, the Architect shall require Contractor to come into compliance. The Architect shall promptly report in writing to the Contractor and Owner any errors, inconsistencies and omissions discovered by the Architect in the Shop Drawings, Product Data and Samples, so as to keep from delaying the Work or the activities of the Owner, Contractor or other Contractors.

§ 4.2.8 The Architect will prepare, and make written recommendations to Owner regarding all Change Orders (including changes in the Work to be paid from contingency funds) and Construction Change Directives, for the Owner's approval and execution in accordance with the Contract Documents. The Architect's recommendation shall be accompanied by all supporting documentation necessary for the Owner to make an informed decision, including but not limited to an itemized turn-key proposal from the Contractor which includes quantities and unit costs of labor and materials extended and totaled and, if permitted, overhead and profit proposed. Prior to submission of such documentation to the Owner, the Architect shall review such proposals for reasonableness of pricing and compliance with Section 7.1.4 regarding markup. The Architect may order minor changes in the Work not involving an adjustment in Contract Sum or Guaranteed Maximum Price, or an extension of the Contract Time which are consistent with the intent of the Contract Documents. If necessary, the Architect shall prepare, reproduce and distribute Drawings and Specifications to describe Work to be added, deleted or modified, as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect and the Owner's representative will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion. Upon completion of such inspection and agreement by Owner and Architect as to Substantial Completion, the Architect may issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10 for approval by the Owner.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 Upon written request of the Owner or Contractor, the Architect will issue its interpretation of the requirements of the plans and specifications. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents and not expressly overruled in writing by the Owner.

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§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information at no additional expense to the Owner.

§ 4.2.15 The Architect may appoint an employee or other person to assist the Architect during the construction. These representatives will be instructed to assist the Contractor in interpreting the Contract Documents; however, such assistance shall not relieve the Contractor from any responsibility as set forth by the Contract Documents. The fact that the Architect's Representative may have allowed Work not in accordance with the Contract Documents shall not prevent the Architect from insisting that the faulty Work be corrected to conform to the Contract Documents and the Contractor shall correct same.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, in writing, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect shall notify the Contractor in writing, whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection. A notice of no reasonable objection shall in no way relieve the Contractor from full responsibility for performance and completion of the Work and its obligations under the Contract Documents. The Contractor shall be fully responsible for the performance of its subcontractors, including those recommended or approved by the Owner.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. When the parties agree on a proposed substitute Subcontractor reasonably capable of performing the Work, the Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected without providing reasonable written notice to the Owner and Architect. If neither the Owner nor Architect submits a reasonable objection to such proposed substitution within ten (10) days following their receipt of written notice the Contractor may proceed with the substitution. If either Owner or Architect submit an objection, the Subcontractor shall proceed in accordance with Section 5.2.3 above.

§ 5.2.5 Each Contractor or subcontractor shall be required to completely familiarize itself with the plans and specifications, to visit the Work site to completely familiarize itself with existing conditions, and to conduct any other appropriate investigations, inspections or inquiries prior to submission of a bid or proposal. No increases in Contract Sum shall be allowed for failure to so inspect or investigate.

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§ 5.3 Subcontractual Relations

§ 5.3.1 By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. The terms and conditions of the Contract Documents shall be incorporated by reference into each subcontract agreement, included as provided below. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. Each subcontractor shall provide proof of insurance to Contractor consistent with the Contractor's insurance to Owner and in an amount commensurate with the Work to be performed by the Subcontractor.

§ 5.3.2 Neither the Owner nor the Architect shall be obligated to pay or to insure the payment of any monies to Subcontractors or vendors by the Contractor.

§ 5.3.3 The Contractor shall require any potential Subcontractor to disclose to the Contractor any ownership interest or familial relationship between the Contractor, the Architect or the Owner and the potential Subcontractor prior to entering into a contract. Contractor shall report to Owner all such disclosures and the Owner shall have the right, in its sole discretion, to reject any such affiliated Subcontractor.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for any unperformed portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner or abandonment of the Project by the Contractor and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing;

.2 assignment is subject to the prior rights and obligations of the surety, if any, obligated under bond relating to the Contract; and

.3 The Subcontractor provides bonds as required by law of prime contractors and by Owner.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation may, in the Owner's sole discretion, be equitably adjusted for increases in cost resulting from the suspension. Such assignment shall not constitute a waiver by Owner of its rights against Contractor, including, but not limited to, claims for defaults, delays or defects for which a subcontractor or material vendor may also be liable.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. Owner shall only be responsible for compensating subcontractors for Work performed or materials furnished from and after the date on which the Owner gives written notice of its acceptance of the subcontract agreement. Owner shall not be responsible for any Work performed or materials furnished by subcontractors prior to the date of Owner's written notice of acceptance.

§ 5.5 Notice Of Subcontractor Default

Contractor shall promptly notify Owner and Architect of any material defaults by any Subcontractor or Sub-subcontractor. Notwithstanding any provision contained in Article 5 to the contrary, it is hereby acknowledged and agreed that Owner has in no way agreed, expressly or implicitly, nor will Owner agree, to allow any Subcontractor, Sub-subcontractor or other materialman or worker employed by Contractor the right to obtain a

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personal judgment or to create a mechanic's or materialman's lien against Owner for the amount due from the Owner or the Contractor.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement by the Owner and Contractor. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 [Paragraph Deleted.]

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for site access, staging, introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work.

§ 6.2.3 All costs resulting from the Contractor's negligence, lack of oversight, inattention to detail, failure to investigate, or failure to follow the Construction Documents or Contract Documents, will be borne by the Contractor. The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor, the Architect or any Consultant because of the Contractor's delays, improperly timed activities or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Owner will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the

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limitations stated in this Article 7 and elsewhere in the Contract Documents. Changes may be funded out of a contingency fund, if any, or other allowance established herein, or may require a change in the Contract Sum. The authority to approve a change to the Work, the Contract Sum, approve payment from a Contingency or Allowance, or a change in the Project Time, rests solely with the Owner. A Change Order funded from the Contingency or other Allowance shall be referred to herein for clarity as a "Contingency Authorization Order".

§ 7.1.2 A Contingency Authorization Order or Change Order shall be based upon agreement among the Owner, Contractor, and Architect executed prior to commencement of any Work covered by the Order. A Construction Change Directive (whether funded from contingency, if any, or by an increase in the Contract Sum) requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor prior to the commencement of the Work. An order for a minor change in the Work may be issued by the Architect alone, except as otherwise provided herein.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 Change Order Mark-Up. On Change Orders and Construction Change Directives, the total Contractor mark-up for overhead, profit permitted to be charged to the Owner shall be based on the following schedule:

.1 for work performed by the Contractor's own forces, Contractor's mark-up for overhead and profit shall not exceed 10% of the cost of the change in the Work (0% for change orders to be paid out of any contingency allowance).

.2 for the Contractor, for supervision of work performed by the Contractor's Subcontractors, the total Contractor mark-up for overhead and profit shall not exceed 4% of the amount due to the Subcontractors (0% for change orders to be paid out of any contingency allowance).

.3 for each Subcontractor or Sub-subcontractor involved, in Work performed by that Subcontractor's or Sub-subcontractor's own forces, the total mark-up for overhead and profit ten percent (10%) of the cost of the change in the Work.

.4 In no event shall total mark-up for overhead, profit or fee in any work which involves a subcontractor or one or more sub-subcontractors, regardless of who performs the work, exceed 14% of the total cost of the change in the Work. The Contractor will not be allowed an overhead, profit, or fee mark-up when changes in the Work are funded by Contingency or other Allowances provided for in the Contract Documents.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

.1 The change in the Work;

.2 The amount of the adjustment, if any, in the Contract Sum; and

.3 The extent of the adjustment, if any, in the Contract Time.

Methods used to determine adjustments to the Contract Sum or Guaranteed Maximum Price may include those listed in Section 7.3.3.

§ 7.2.2 Acceptance of a disbursement from any allowance fund, contingency fund or acceptance of a Change Order by the Contractor shall constitute full accord and satisfaction for any and all claims, whether direct or indirect, including but not limited to impact, delay or acceleration damages, arising from the subject matter of the disbursement or Change Order.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum (the Guaranteed Maximum Price, as applicable) or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum (the Guaranteed Maximum Price, as applicable) and Contract Time being adjusted as provided in Section 7.3.3.

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§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum (or the Guaranteed Maximum Price, as applicable), the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 Unit prices stated in the Contract Documents or subsequently agreed upon(additional mark-ups for overhead and profit will not be allowed);

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee, subject to the limitations of subparagraph 7.1.4; or

.4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum (or the Guaranteed Maximum Price, as applicable), the Architect shall determine the adjustment on the basis of the amount by which the Contractor's direct costs have actually been increased over the direct cost of performing the Work without the Change in the Work. Direct costs shall be limited to the following:

.1 Actual documented costs of labor, including applicable payroll taxes and other employee costs approved by the Owner prior to the approval of the Change Order or Contingency Authorization Order (a labor burden factor will not be accepted as documentation);

.2 Actual documented costs of materials, supplies, and equipment, including cost of transportation, whether such materials, supplies, and equipment are incorporated or consumed;

.3 Actual documented rental costs of machinery and equipment, if rented from unaffiliated third-parties, exclusive of hand tools;

.4 Actual documented costs of premiums for all bonds and insurance, permit fees, and applicable sales, use, or similar taxes, directly related to the change, if any; and

.5 Actual documented costs of supervision and field office personnel directly attributable to the change and only if the adjustment causes an extension of the Contract Time.

The Contractor shall keep and present, in such form as the Architect or Owner may prescribe, an itemized accounting of the items listed above, together with appropriate supporting documentation.

§ 7.3.5 If the Work is performed without an agreement as to the final price, the Contractor shall, at a minimum, retain and provide to the Owner, the following documentation to adequately document its actual costs of performing the scope of work set out in a Construction Change Directive. Adequate Documentation shall include at a minimum, but not limited to, payroll records for employees of Contractor providing the Work included in the Change Directive, as well as written documentation of time spent solely on the scope of the Change Directive Work, prepared concurrent with the performance of the Work, including (for example) sign-in and sign-out sheets or time cards, executed by the employee(s) documenting attendance and receipts for all materials delivered to the Project site for incorporation in the Work of the Change Directive and paid for by the Contractor. If any of the Work of the Change Directive is performed by subcontractors, the Contractor shall provide a copy of the subcontract, an itemized invoice or payment application which includes, in either case, a detailed itemization of costs showing quantities and unit costs of labor and materials extended and totaled and, if permitted, overhead and profit (in accordance with Section 7.1.4) labor and materials provided by the subcontractor, with receipted invoices for all materials incorporated in the Work and evidence of payment by the subcontractor attached. If the Contractor disagrees with the adjustment in the Contract Time, the Contract Sum (or the Guaranteed Maximum Price, as applicable), allowed in any Change Directive, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement (by executing and returning the Change Directive) or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time, not later than ten (10) calendar days following the Contractor's receipt of the Construction Change Directive. A copy of a notice of disagreement shall also be provided to the Owner concurrent with the notice to the Architect. A Notice of Disagreement must contain the number of the Change Directive, the date the Change Directive was issued and the words **"Notice of Disagreement With Change Directive"** in the Subject line. It is imperative that Owner receive timely specific notice of any potential problem identified by Contractor in order that the problem can be mitigated or resolved promptly.

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§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and/or the Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost plus the permitted overhead and profit as set forth in Section 7.1.4. When both additions and credits covering related Work or substitutions are involved in a change, both changes shall be shown on the same Change Order and the permitted allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change. Returned materials shall be credited at actual cost and no penalty or restocking fee shall be permitted to be charged to the Owner.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will require as a condition precedent to certification of payment for Work completed under the Construction Change Directive that the Contractor provide the documentation required by Section 7.3.4, and based on such documentation, shall make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect is specifically authorized by this Section 7.3.9 to require submission of such documentation and any other documentation required to evaluate the requested payment, and shall withhold payment certification until such documentation is received and an interim determination is made in accordance with this Section. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order reflecting the Agreement of the Owner and Contractor. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

With prior written notice to the Owner's representative, the Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time. The Contractor shall carry out such written orders promptly. Minor changes in the Work shall not include changes that involve the outward appearance of the structure, color schemes, floor plans, building materials, landscaping, or mechanical equipment.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Contract Time. Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 Commencement. The date of commencement of the Work shall be the first business day following the Contractor's written notice to proceed. The notice to proceed shall not be issued until the Agreement (or Guaranteed Maximum Price Amendment, as applicable) has been signed by the Contractor and the Owner, and the Owner and Architect have received and approved as to form all required payment and performance bonds and insurance as required by Article 11.

§ 8.1.3 Substantial and Final Completion

§ 8.1.3.1 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

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§ 8.1.3.2 The date of Final Completion is the date certified by the Architect in accordance with Section 9.10. Unless otherwise agreed in writing by Owner, Contractor agrees that Final Completion shall occur not more than thirty (30) days after the date of Substantial Completion.

§ 8.1.4 Day. The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor stipulates that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.2.4 Liquidated Damages

§ 8.2.4.1 If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, the Owner shall be entitled to retain or recover from the Contractor and the Contractor's surety, as liquidated damages and not as a penalty, the per diem amounts set out in the AIA Document A101 (2017) or the AIA Document A133 (2019) into which these General Conditions are incorporated and executed concurrently with these General Conditions, commencing upon the first day following expiration of the Contract Time and continuing until the actual Date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable estimate of damages the Owner will incur as a result of delayed completion of the Work.

§ 8.2.4.2 In the event Substantial Completion is not achieved by the designated date, or as it may be extended, Owner may withhold payment of any further sums due until Substantial Completion is achieved. Owner shall also be entitled to deduct out of any sums due to Contractor all liquidated damages, if any, due Owner in accordance with the Contract Documents.

§ 8.2.4.3 In addition to Liquidated Damages, if any, the Contractor shall reimburse the Owner for any Supplemental or Additional Services of the Architect for additional site visits made necessary by the fault, neglect or request of the Contractor or caused by Contractor's failure to achieve the applicable Contract Time requirements.

§ 8.2.4.4 If one or more of the Liquidated Damages provisions set out in the Agreement are held to be legally unenforceable as a penalty (except when the holding is the result of a challenge by the Owner), the Owner shall be allowed to recover actual damages caused by the Contractor's failure to achieve the applicable Contract Time requirements.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by war, civil commotion, pandemic, epidemic, federal, state or local declared disaster or public emergency, act of God, governmental restrictions, regulations, orders, or interference, fire or other unavoidable casualty, material changes ordered in the Work; adverse weather conditions documented in accordance with Section 15.1.6 by delay authorized in writing by the Owner prior to the happening of the delay event; or (5) by other causes that the Contractor asserts, and the Architect and Owner determine, justify delay, then the Contract Time may be extended for such reasonable time as the Architect and Owner may determine based upon documentation by the Contractor.

§ 8.3.1.1 The adjustment of the Contract Time for delay, disruption, and interference described in this Section 8.3.1 is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Time and Contractor's timely delivery of the notice and claim as set out in this Section 8.3.1. An adjustment to the Contract Time shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this Section 8.3.1, and under no circumstances shall the Owner be liable to pay the Contractor any compensation for Owner-caused delays.

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§ 8.3.1.2 Notice and Claim for Extension. In the event of a delay in the commencement or progress of the Work as a result of any of the circumstances in this Section 8.3.1, the Contractor may receive an extension of time for completion of the Work equal to the delay, if the Contractor delivers a written notice and claim to the Owner and Architect delivered in any manner provided in Section 1.6.1 of this Agreement. The Notice shall identify and provide a reasonably detailed description of the circumstances causing the delay, disruption, or interference to the Contractor's performance or progress of the Work on or before the due date of Contractor's Application for Payment covering the period in which the delay began. Claims for an extension of time shall be stated in whole or half calendar days, as applicable. The actual date on which the delay(s) began and/or the date the delay ended, if applicable, must be stated in the Claim Notices as applicable.

§ 8.3.2 In the case of claims for extension of time because of unusually inclement weather, such extension of time may be granted only if the Contractor files a claim in accordance with the requirements set out in Section 15.1.6.

§ 8.3.3 Contractor shall not be entitled to an adjustment in the Contract Time for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

§ 8.3.4 Any adjustment of the Contract Time authorized under Section 8.3 shall be conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Time and Contractor's submission of a timely and properly documented Notice and Claim for additional time in accordance with Section 8.3.

§ 8.3.5 Adjustments to the Contract Time addressed in this Section 8.3 shall apply only to requests for extensions of time based upon delay, disruption, or interference to the Contractor's performance or progress of the Work and shall have no applicability to requests for adjustment of the Contract Time due to other changes in circumstance, including but not limited to: a change in the materials used; a change in the specified manner of constructing and/or installing the Work; or additional labor, services or materials required, beyond those specified by the Contract Documents. Claims for an adjustment of the Contract Time resulting from these kinds of changes shall be authorized only pursuant to a written order or directive from Owner authorizing Contractor to proceed with a change in the Work in accordance with the Contract Documents.

§ 8.4 No Damages or Other Compensation for Delay or Acceleration

This Agreement does not permit recovery by the Contractor of damages or additional compensation for delay, acceleration, disruption, or interference to the Contractor's performance or progress of the Work Contractor agrees that Contractor shall be fully compensated for all delays solely by an extension of time including but not limited to delay, disruption, or interference caused by the Owner the Architect, of an employee of either, or of a Separate Contractor, any of the circumstances set out in Section 8.3.1 or acceleration of the Work required by the Owner in accordance with the terms of this Agreement. Contractor's sole remedy for delay disruption, or interference in its performance or progress of the Work or any required acceleration of the Work shall be the grant of an extension of time for completion equal to a delay or such reasonable time as the Owner and Architect may determine in their sole discretion.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement or the Guaranteed Maximum Price Amendment in the case of a Construction Manager at Risk Contract and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. All costs of overtime Work required by the Contract Time and the nature of the Work, as set forth in or inferable from the Contract Documents, except costs of emergencies covered in Section 10.4, shall be and are included in the Contract. The Contract Sum shall not be increased because the Contractor experiences an unexpected or unforeseeable increase in the price of labor or materials required to complete the Project.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices may be equitably adjusted by written agreement between the Owner and Contractor, executed prior to an order being placed based on the unit prices.

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§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, as applicable, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment or, in the case of a Guaranteed Maximum Price, concurrent with the Guaranteed Maximum Price Proposal, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, or the Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment. The schedule of values shall be prepared in such a manner that each major item of work, whether done by Contractor's own forces or subcontracted, is shown as a single line item on AIA Documents G702-1992 and G703-1992, Application and Certificate for Payment and Continuation Sheet.

§ 9.3 Applications for Payment

§ 9.3.1 In accordance with the requirements of Section 5.1 of the Agreement, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage withheld. The form of Application for Payment, duly notarized, shall be a current authorized edition of AIA Document G702-1992, Application and Certificate for Payment, supported by a current authorized edition of AIA Document G703-1992, Continuation Sheet.

§ 9.3.1.1 Such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor has not been invoiced by a Subcontractor or supplier, unless such Work was self-performed; in such case, only portions of Work actually performed shall be included on the Contractor's request for payment.

§ 9.3.1.3 Contractor agrees that, for purposes of Texas Government Code section 2251.042, receipt of the Application for Payment by the Architect shall not be construed as receipt of an invoice by the Owner. Contractor further agrees that Owner's receipt of the Architect's Certificate for Payment shall be construed as a receipt of an invoice by the Owner, for purposes of Texas Government Code section 2251.042.

§ 9.3.1.4 The Owner shall withhold retainage as provided in the Agreement, except that Owner shall not pay amounts for which the Architect refuses to certify payment, or the Owner refuses to pay, as provided herein. The retainage shall be paid to the Contractor with the Final Payment, subject to the requirements of the Contract Documents.

§ 9.3.2 Unless otherwise provided in a separate written agreement executed between the Owner and Contractor prior to delivery, payments shall not be made on account of materials and equipment delivered and stored at the site or off-site for subsequent incorporation in the Work. The Owner may, in Owner's sole discretion, require Contractor's compliance with such reasonable procedures and requirements as it may establish, as a condition precedent to the grant of Owner's consent and agreement to payment, including but not limited to the following:

.1 provision of any additional insurance required to protect the materials and equipment while stored;
.2 payment of the costs to store the materials and equipment and any additional transportation costs for multiple deliveries;
.3 provision of written consent of Contractor's surety to such storage;
.4 submission of an affidavit identifying materials and equipment stored off-site for later incorporation into the Work, and acknowledging responsibility for such materials and equipment;
.5 provision of documentation that the facility where the materials and/or equipment will be stored is an adequately insured commercial warehouse, where the materials and equipment stored will be sheltered from the weather and outside elements and are stored in accordance with the manufacturer's instructions, including proper temperature and humidity controls and that the materials and equipment have been physically separated and marked for the Project;

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.6. its agreement to bear the cost of Owner and/or Architect's visits to the off-site storage facility to confirm compliance with these requirements and review the stored contents, and Contractor shall agree to allow such costs to be offset from Progress Payments;

.7 agreement that payment of any costs related to compliance with the procedures and requirements for storage of materials and equipment on or off-site, shall not be subject to charges for overhead or profit;

.8 submission of bills of sale or other documentation acceptable to the Owner, showing proof of delivery and establishing the Owner's title to the materials or equipment and/or otherwise protecting the Owner's interest, including naming the Owner as additional insured on the required insurance policy (naming the specific materials or equipment stored and their location) and providing proof of delivery for those materials and equipment;

.9 agreeing that, in the event of termination of the Contract or default by the Contractor, the material and equipment stored on or off-site shall be immediately turned over to the Owner by delivery to the location designated by the Owner and that the operator of the storage facility is aware of this agreement and willing to honor it; and

.10 agreeing that all such stored materials and equipment, to the extent they include mechanical components, will be maintained by the Contractor kept in good working condition and ready for immediate installation, to the same extent they would have been, had they been delivered "just in time" for installation, that Contractor will be solely responsible for assuring any manufacturer's warranty will commence on date of completion of installation and/or start-up of the material or equipment and for repairs required prior to installation to assure performance in accordance with the Contract Documents.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work. **CONTRACTOR SHALL INDEMNIFY AND HOLD OWNER HARMLESS FROM ANY LIENS, CLAIMS, SECURITY INTERESTS OR ENCUMBRANCES FILED BY A SUPPLIER, SUBCONTRACTORS, OR ANYONE CLAIMING BY, THROUGH OR UNDER THE CONTRACTOR OR SUBCONTRACTOR FOR ITEMS COVERED BY PAYMENTS PREVIOUSLY MADE BY THE OWNER TO CONTRACTOR FOR ITEMS COVERED BY PAYMENTS MADE BY THE OWNER TO CONTRACTOR.**

§ 9.3.4 In each Application for Payment, Contractor shall certify that: the information contained in the Application presented is true, correct, accurate and complete; that the submitted Work has been completed to the extent represented in the Applications for Payment; that the materials and supplies identified in the Applications for Payment have been purchased, paid for, and, unless an agreement described in Paragraph 9.3.2 has been signed, incorporated into the Work; that the subcontractors whose work is identified in the Applications for Payment have been paid, or Contractor has been invoiced for same and intends to pay such subcontractors; there are no known mechanics' or materialmens' liens outstanding at the date of the Application, that all due and payable bills with respect to the Work have been paid to date or are included in the amount requested in the current Application and that except for such bills not paid but so included, there is no known basis for the filing of any mechanics' or materialmens' liens on the Work, and that releases from all contractors and materialmen have been obtained in such form as to constitute an effective release of lien under the laws of the State of Texas covering all Work theretofore performed and for which payment has been made by Owner to Contractor.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, carefully evaluate and review the Application for Payment and, when appropriate, return the Application for Payment to the Contractor as provided in Section 9.4.2. If the Application for Payment is complete, then the Architect shall sign and, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner in writing, of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner in writing, of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. Architect's written reasons for withholding certification shall be construed as the notice required by Texas Government Code Section 2251.042 *et seq.*

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§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, that the Architect has observed the progress of the Work and determined that, in the Architect's professional opinion based on the Architect's evaluation of the Work and the data in the Application for Payment, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect in writing to the Owner. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data unless requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum. Examinations, audits, and verifications, if required by the Owner, will be performed by the Owner's accountants or other representatives of the Owner acting in the sole interest of the Owner.

§ 9.4.3 The issuance of a Certificate for Payment shall constitute a recommendation to the Owner regarding the amount to be paid. This recommendation is not binding on the Owner if Owner knows of other reasons under the Contract Documents why payment should be withheld.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of:

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- .7 repeated failure to carry out the Work in accordance with the Contract Documents;
- .8 delay beyond the times set forth elsewhere in the Contract Documents including but not limited to the submission for approval of the schedule of values, cost breakdowns on proposal requests, progress schedule, list of Subcontractors and insurance requirements;
- .9 failure to submit a written plan indicating action by the Contractor to regain the time schedule for completion of Work within the Contract Time;
- .10 evidence of financial inability to perform the Contract fully;
- .11 failure to submit record documents required by the Contract; or
- .12 failure of the Contractor to perform any other obligations of the Contract.

§ 9.5.2 If the Contractor disputes the Architect's or the Owner's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, the Contractor may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld. The Owner shall not be deemed in default by reason of withholding payment as provided for in Section 9.5.1.

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§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment. Notwithstanding any provision contained within this Article, if the Contractor has not achieved Substantial Completion by the required date, subject to extensions of time allowed under the Contract Documents, then Architect may withhold any further Certificate for Payment to the extent necessary to preserve sufficient funds to complete construction of the Project and to cover liquidated damages. The Owner shall not be deemed in default by reason of withholding payment as provided for in Section 9.5.1, or this Section 9.5.4.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued and the Owner has approved a Certificate for Payment, the Owner shall make payment of disputed amounts in the manner and within the time provided in the Contract Documents, and in accordance with the Texas Government Code section 2251.042 *et. seq.*, Owner shall within twenty-one (21) days notify the Architect and Contractor if Owner disputes the Architect's Certificate for Payment, listing the specific reasons for nonpayment. Payments to the Contractor shall not be construed as releasing the Contractor or his Surety from any obligations under the Contract Documents.

§ 9.6.2 In compliance with Texas Government Code Section 2251.022, the Contractor shall, within ten (10) days following receipt of payment from the Owner, pay all bills for labor and materials performed and furnished by others in connection with the construction, furnished and equipping of the improvements and the performance of the Work, and shall, if requested, provide the Owner with evidence of such payment. Contractor's failure to make payments within such time shall constitute a material breach of this contract. Contractor shall include a provision in each of its contracts imposing the same payment obligations on its Subcontractors as are applicable to the Contractor hereunder. If the Contractor has failed to make payment promptly to the Contractor's Subcontractors or for materials or labor used in the Work for which the Owner has made payment to the Contractor, the Owner shall be entitled to withhold payment to the Contractor in part or in whole to the extent necessary to protect the Owner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 The Contractor shall, as a condition precedent to any obligation of the Owner under the Contract Documents, provide to the Owner payment and performance bonds in the full penal amount of the Contract in accordance with Texas Government Code Chapter 2253. Notwithstanding the foregoing, payments received by the Contractor from the Owner for Work properly performed by Subcontractors, or materials properly provided by suppliers, shall be held in trust by the Contractor for the benefit of those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

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§ 9.7 Failure of Payment

Pursuant to Texas Government Code Section 2251.051,if the Owner does not pay the Contractor any payment certified by the Architect, which is undisputed, due and owing after the date the payment is due under the Contract Documents, then the Contractor may, upon ten (10) days' written notice to the Owner and Architect, that payment has not been made and the Contractor intends to suspend performance for nonpayment, may stop the Work until payment of the undisputed amount owing has been received. If the Owner provides written notice to the Contractor that: 1) payment has been made; or 2) a bona fide dispute for payment exists, listing the specific reasons for nonpayment, then Contractor shall be liable for damages resulting from suspension of the Work. If a reason specified is that labor, services, or materials provided by the Contractor are not provided in compliance with the Contract Documents, then the Contractor shall be provided a reasonable opportunity to cure the noncompliance or to compensate Owner for any failure to cure the noncompliance. No amount shall be added to the Contract Sum as a result of a dispute between Owner and Contractor unless and until such dispute is resolved in Contractor's favor.

§ 9.7.1 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, then such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due to Owner, pursuant to the Contract, or if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, then the Owner shall have an absolute right to offset such amount against the Contract Sum and, in the Owner's sole discretion and without waiving any other remedies, may elect to either: (1) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due to Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use; provided, however, as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project (or if the same cannot be delivered for reasons not the fault or responsibility of the Contractor, nevertheless all Contractor's obligations necessary to the issuance of such certificates, permits, approvals, or licenses will have been performed.) Without limiting the foregoing, in general, the only remaining Work following Substantial Completion shall be minor in nature, so that the Owner could occupy the Project on that date and the completion of the Work by the Contractor would not materially interfere or hamper the Owner's normal business operations. To be substantially complete, Contractor shall be complete with all required testing, HVAC Test, Adjust and Balancing and Commissioning of electrical systems, HVAC systems, Building Automation Control Systems and other systems as applicable as required by the Contract Documents (including project manual), project specifications and drawings and the International Energy Conservation Code with Preliminary Report(s) being issued to Engineer and Owner for acceptance. Reports shall include a complete list of deferred testing or deficiencies that requires further remediation.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect accompanied by the Owner or Owner's representative, at the Owner's option, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, then the Architect shall so notify the Contractor and Owner in writing, and the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.3.1 If, in Architect's opinion during the inspection, the Project, or the designated portion thereof which Owner has agreed to accept separately, is not sufficiently complete to warrant inspection, or if the list of items to be completed

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or corrected is not sufficiently complete to warrant inspection, then Architect may terminate the inspection and notify the Contractor that the Project is not ready for inspection. If for such reasons, Architect is required to make additional inspections, the Owner may deduct the cost of Architect's additional services made necessary thereby from any payments due the Contractor. The Architect's compensation shall be determined in accordance with the applicable provisions of the Agreement between the Owner and Architect.

§ 9.8.3.2 Except with the consent of the Owner, the Architect will perform no more than ONE (1) inspection to determine whether the Work has attained Substantial Completion in accordance with the Contract Documents. The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect, Engineer, Consultant or service provider for any additional inspections.

§ 9.8.4 When the Work or designated portion thereof is Substantially Complete, as defined by the Contract Documents, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof, unless otherwise provided in the Certificate of Substantial Completion. If Work is to be completed or corrected after the date of Substantial Completion and prior to final payment, Warranties for Work to be completed or corrected after the date of Substantial Completion and prior to final payment shall become effective on the later of the date the Work is completed or corrected and accepted by the Owner and Architect, or the date of Final Payment. ("Warranty Commencement Date").

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate.

§ 9.8.6 Retainage is not due to the Contractor until thirty-one (31) days after Final Completion of the Work as set out in Section 9.10. After the Certificate of Substantial Completion is accepted by the Owner, the Owner may, in its sole discretion and upon acceptance and consent of surety, make payment of retainage on all or a part of the Work accepted.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to in writing by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work resulting from such occupancy, use or installation, and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties on the partially completed portion of the Work, as required by the Contract Documents. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect. Contractor agrees that the Owner may place and install as much equipment and furnishings as is possible before completion or partial completion of portions of the Work.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless expressly agreed upon in writing, partial occupancy or use of a portion or portions of the Work or installation of furnishings and equipment shall not constitute acceptance of Work not complying with the requirements of the Contract Documents, nor shall it constitute evidence of Substantial Completion or Final Completion.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 When all of the Work is finally completed and the Contractor is ready for a final inspection it shall notify the Owner and the Architect thereof in writing. Thereupon, the Architect and Owner (at Owner's option) will make final inspection of the Work and, if the Work is complete in full accordance with the Contract Documents and this Contract has been fully performed, the Architect will promptly issue a final Certificate for Payment certifying to the Owner that the Work has been completed in accordance with the Contract Documents and that remainder of the Contract Sum,

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including all retainage, less any amount withheld pursuant to the Contract and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. Except with the consent of the Owner, the Architect will perform no more than one (1) inspection to determine whether the Work has attained Final Completion in accordance with the Contract Documents. Final Certificate for Payment and release of retainage will not be considered unless all testing, HVAC Test, Adjust, and Balance, and Commissioning reports required by the Contract Documents (including project manual), project specifications and drawings and the International Energy Conservation Code are provided in their FINAL format showing that all findings of noncompliance have been corrected. If the Architect is unable to issue its final Certificate for Payment and is required to repeat its final inspection of the Work, the Contractor shall bear the cost of such repeat final inspection(s) which cost may be deducted by the Owner from the Contractor's final payment. The project Architect/Engineer for this project will not issue a Final Certificate of Payment and release of retainage unless all testing, HVAC Test, Adjust, and Balance, and Commissioning reports required by the Contract Documents (including project manual), project specifications, and drawings and the International Energy Conservation Code are provided in their FINAL format showing that all findings of noncompliance have been corrected.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) its affidavit that payrolls, bills for materials and equipment, and other liabilities connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) except for amounts previously withheld by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may have been fully paid or otherwise satisfied; releases and waivers of liens from all Subcontractors of the Contractor and of any and all other parties required by the Architect or the Owner; such other provisions as Owner may request; and consent of Surety to final payment. If any third party fails or refuses to provide a release of claims or waiver of lien as required by Owner, the Contractor shall furnish a bond satisfactory to the Owner to discharge any such lien or indemnify the Owner from liability; (7) In addition, the following items must be completed and received by the Owner before Final Payment will be due:

.1 Written certifications required by Sections 10.5, 10.6, and 10.7 herein;
.2 Final list of subcontractors (AIA Document G705-2001);
.3 Contractor's Certification of Project Compliance required by 16 Texas Administrative Code, Section 61.1036, located at: https://tea.texas.gov;
.4 Contractor's warranties, organized as required elsewhere in the Contract Documents;
.5 Maintenance and Instruction Manuals;
.6 Owner's Certificate of Final Completion; and
.7 "As-constructed record drawings". At the completion of the Project, the Contractor shall submit one complete set of "as-constructed" record drawings, with all changes made during construction, including concealed mechanical, electrical, and plumbing items. The Contractor shall submit these as electronic, sepia, or other acceptable medium, in the discretion of the Owner. The "as-constructed" record drawings shall delete the seal of the Architect and/or the Engineer and any reference to those firms providing professional services to the Owner, except for historical or reference purposes.

Documents identified as affidavits must be notarized. All manuals will contain an index listing the information submitted. The index section will be divided and identified by tabbing each section as listed in the index. Upon request, the Architect will furnish the Contractor with blank copies of the forms listed above.

§ 9.10.3 The Owner shall make final payment of all sums due the Contractor not more than thirty-one (31) days after the Architect's execution of a final Certificate for Payment. Final Payment shall not constitute a waiver of any Claims by the Owner.

§ 9.10.4
(Paragraphs deleted)

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[Paragraph Deleted.]

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously asserted pursuant to Article 15 and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.10.6 The Contractor shall not permit any actual or purported lien, charge or claim to attach or attempt to attach to the Work, the site or any amounts due or to become due to the Contractor under the Contract Documents. If any such lien, charge or claim is so asserted, the Contractor shall promptly procure its release and indemnify the Owner against all damage and expense incident thereto. Upon completion of the Work and before any final payment and settlement, the Contractor shall provide evidence satisfactory to the Owner of payment and release of all debts, taxes, liens, charges, obligations and claims for or relating to labor, materials, Subcontractors and Sub-subcontractors; provided, however, that if the Contractor has not paid for any of the aforesaid as a result of a bona fide dispute, and payment of such is guaranteed and covered by the payment bond provided by the Contractor, then the Contractor shall not be required to pay such claim as a condition to final payment and settlement, but instead shall be required to provide Owner with written consent to final payment executed by such surety, expressly acknowledging the existence of such unpaid claim, and agreeing that full and final payment to the Contractor shall not impair any of the Owner's rights or the surety's obligations under the bond.

§ 9.11 Audit

Contractor agrees to maintain adequate books, payrolls and records satisfactory to the Owner in connection with any and all Work performed hereunder. Contractor agrees to retain all such books, payrolls and records (including data stored in computer) for a period of not less than three (3) years after completion of the Work. At all reasonable times, Owner and its duly authorized representatives shall have access to all personnel of Contractor and all such books, payrolls and records, and shall have the right to audit same.

§ 9.12 In addition to any liquidated damages payable to the Owner by the Contractor, if: (1) the Architect is required to make more than one (1) inspection for Substantial Completion; (2) the Architect is required to make more than 1 inspection for Final Completion; or (3) the Work is not substantially complete within thirty (30) days after the date established for Substantial Completion in the Contract Documents; the Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for any additional inspections or services.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract and shall conform to all provisions of the "Manual of Accident Prevention in Construction", published by the Associated General Contractors of America, Inc., latest edition, and the Contractor further agrees to fully comply with all safety standards required by the Occupational Safety and Health Administration ("OSHA") 29 USC Section 651 et seq., and all amendments thereto. However, the Contractor's duties herein shall not relieve any Subcontractor or any other person or entity, including any person or entity required to comply with all applicable federal, state and local laws, rules, regulations, and ordinances, from the obligation to provide for the safety of their employees, persons, and property and their requirements to maintain a work environment free of recognized hazards. Contractor shall provide reasonable fall protection safeguards and provide approved fall protection safety equipment for use by all exposed Contractor employees.

§ 10.1.1 Contractor shall ensure that the Project site is alcohol-free, drug-free, nicotine/ tobacco-free, e-cigarette free, weapon-free, and sexual-harassment free, and shall require strict compliance on the Project Site with the Owner's Board Policies, including but not limited to GKA(Legal) and GKA(Local). Contractor will remove any of its employees from performing the Work any time there is suspicion of alcohol and/or drug use, possession, or impairment involving such employee, and at any time an incident occurs where drug or alcohol use could have been a contributing factor. Owner has the right to require Contractor to remove employees from performing the Work any time cause exists to suspect alcohol or drug use. In such cases, Contractor's employees may only be considered for return to work after the Contractor certifies as a result of a for-cause test, conducted immediately following removal that said employee was in compliance with this contract. Contractor will not use an employee to perform the Work who either refuses to take, or tests positive in, any alcohol or drug test.

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10.1.2 Dress Code, Fraternization and Sexual Harassment. Contractor shall require adequate dress of the Contractor's forces consistent with the nature of the Work being performed, including wearing shirts at all times. Contractor shall prohibit fraternization between all persons working under Contractor or any of its subcontractors, students and Owner's employees while on Owner's property. Sexual harassment of employees of the Contractor or employees or students of the Owner by employees of the Contractor is strictly forbidden. Any employee of the Contractor who is found to have engaged in such conduct shall be subject to appropriate disciplinary action by the Contractor, including removal from the job site.

§ 10.1.3 Weapons. Owner has also banned use, possession, or display of any firearm, handgun, location-restricted knife, club, or "prohibited weapon", as defined by the Texas Penal Code and Owner's Board Policy FNCG(Legal), except when the Contractor, its representatives, employees, agents, and subcontractors, or anyone else over which the Contractor has control or authority holds a Texas handgun license, stores the handgun or other firearm in a locked vehicle in the Owners parking lot, garage, or other parking area provided by the Owner AND the firearm is not loaded and not in plain view. A copy of such policy is available through a link on the Owner's website. The Contractor further agrees that Contractor's representatives, employees, agents, and subcontractors will abide by these requirements as well as the Federal Gun-Free School Zones Act.

§ 10.1.4 Tobacco and E-Cigarettes. Contractor's employees, agents, Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, shall not use e-cigarettes or tobacco products while on the Project Site.

§ 10.1.5 Small Unmanned Aircraft (Drones). The Contractor shall operate any Small Unmanned Aircraft as required by 14 C.F.R. Part 107. as applicable, and any other applicable federal or state laws and regulations.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall maintain good order among its employees and its Subcontractors, shall confine its employees and Subcontractors to such work areas, roads and gates as directed by the Owner, take reasonable and necessary precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

.1 employees on the Work, school personnel, students and other persons on the Owner's premises and other persons who may be affected thereby, which protection shall include the installation of fencing between the Work site and the occupied portion of a connecting or adjacent educational facility, and taking reasonable precautions to secure any abusable glue, aerosol paint, or any other chemical substance for inhalation being used on the project site;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

.3 other property at the site or adjacent thereto, such as fences, trees, shrubs, lawns, walks, athletic fields and tracks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction. Contractor's obligations under this Section shall continue to apply during any time period when all or a portion of the Work is suspended for any reason. Contractor's obligations under Section 10.2 as to each portion of the Project shall continue until Owner takes possession of and occupies that portion of the Project.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including installing fencing, posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor. Contractor shall provide reasonable fall protection safeguards and provide approved fall protection safety equipment for use by all exposed Contractor employees.

§ 10.2.4 When use or storage of hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly

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qualified personnel, and shall only conduct such activities after giving reasonable advance written notice of the presence or use of such materials, equipment or methods to Owner and Architect. The storage of explosives on Owner's property is prohibited. The use of explosive materials on Owner's property is prohibited unless expressly approved in advance in writing by Owner and Architect.

§ 10.2.5 [Paragraph Deleted.]

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

§ 10.2.8.1 If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 3 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter. No provision of the Contract Documents shall waive Owner's immunity under the Texas Tort Claims Act, Texas Civil Practice and Remedies Code, Chapter 101.

§ 10.2.8.2 The Contractor shall promptly report in writing to the Owner and Architect all accidents arising out of or in connection with the Work which cause death, bodily injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious bodily injuries, or serious property damages are caused, then the accident shall be reported immediately by any means necessary to give actual notice to the Owner's representative and the Architect.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition. If such notice is provided orally, written confirmation of such notice by Contractor shall be provided not later than one (1) business day following such notification. Owner shall not be responsible for materials or substances brought to the site by the Contractor.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall, as soon as reasonably possible, obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. Contractor may be entitled to an extension of the Contract Time in accordance with Article 8.3.

§ 10.3.3 To the extent permitted by the laws and Constitution of the State of Texas, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim,

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damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity. Notwithstanding anything to the contrary contained in this Section 10.3.3, the agreement of the Owner to indemnify, defend and hold harmless the parties described in this Section shall not extend or apply to claims, damages, losses, expenses or liabilities related to, created or caused in whole or in part by a party indemnified hereunder; it being agreed and understood that the Owner and any party so indemnified shall each bear liability for its own negligent acts or omissions, and that such indemnity shall extend only to liability for the negligent acts and omissions of the Owner.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents.

§ 10.3.5 Except to the extent that the cost and expense are due to the Owner's fault or negligence, if Contractor imports hazardous materials onto the Project site, the Contractor shall indemnify and hold harmless the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, (2) where the Contractor fails to perform its obligations under Section 10.3.1; and (3) any fines or penalties of government agencies directly resulting from the Contractor's importation of the hazardous materials onto the Project site.

§ 10.3.6 [Paragraph Deleted.]

§ 10.4 Emergencies

§ 10.4 .1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

§ 10.4.2 The performance of the foregoing services by the Contractor shall not relieve the subcontractors of their responsibility for the safety of persons and property and for compliance with all federal, state and local statutes, rules, regulations and orders of any governmental authority applicable to the conduct of the Work.

§ 10.5 Asbestos Or Asbestos-Containing Materials. Contractor shall submit to the Architect a written certification addressed to the Owner that all materials used in the construction of this Project contain less than 0.10% by weight of asbestos and for which it can be demonstrated that, under reasonably foreseeable job site conditions, will not release asbestos fibers in excess of 0.1 fibers per cubic centimeter. The written certification shall further state that, should asbestos fibers be found at this Project in concentrations greater than 0.1 fibers per cubic centimeter, then Contractor shall be responsible for determining which materials contain asbestos fibers and shall take all necessary corrective action to remove those materials from the Project, at no additional cost to the Owner. The written certification shall be dated, shall reference this specific Project and shall be signed by not less than two (2) officers of the Contractor. Final Payment shall not be made until this written certification has been received.

§ 10.6 Lead-Free Material In Potable Water System

§ 10.6.1 Prior to payment of retainage and final payment, the Contractor and each subcontractor involved with the potable water system shall furnish a written certification that the potable water system is "lead-free".

§ 10.6.2 The written certification shall further state that should lead be found in the potable water system built under this Project, then Contractor shall be responsible for determining which materials contain lead and shall take all necessary corrective action to remove lead from the Project, at no additional cost to the Owner. The written certification shall be dated, shall reference this specific Project and shall be signed by not less than two (2) officers of the Contractor.

§ 10.7 Hazardous Materials Certification

The Contractor shall provide written certification that no materials used in the Work contain lead or asbestos materials in them in excess of amounts allowed by federal, state or local standards, laws, codes, rules and regulations; the Federal Environmental Protection Agency (EPA) standards; and/or the Federal Occupational Safety and Health Administration (OSHA) standards, whichever is most restrictive. The Contractor shall provide this written certification as part of submittals under the Section in the Project Manual related to Contract Closeout.

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ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance

§ 11.1.1 The Contractor and the Contractor's Subcontractors shall purchase and maintain in force, insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the table below the Agreement or elsewhere in the Contract Documents. No Work will be commenced, and no equipment or materials may be shipped, until all requirements of Article 11 have been satisfied, satisfactory evidence of insurance has been provided, and all required insurance is in full force and effect. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the State of Texas.

Workmen's Compensation: (Including Waiver of Subrogation Endorsement)	All liability arising out of Contractor's employment of workers and anyone for whom Contractor shall be liable for Worker's Compensation claims. Worker's Compensation is required and no "alternative" form of insurance shall be permitted.
Employer's Liability:	$1,000,000.00
Commercial General Liability: Each Occurrence General Aggregate Personal & Advertising Injury Products and Completed Operations	 $3,000,000.00 $5,000,000.00 (A Designated Construction Project General Aggregate Limit shall be provided) $1,000,000.00 each person $1,000,000.00 (for one (1) year, commencing with issuance of final Certificate for Payment)
Property Damage Independent Contractors Contractual Liability	$2,000,000.00 each occurrence $4,000,000.00 aggregate (Same limits as above) (Same limits as above)
Automobile Liability: Bodily Injury/Property Damage	$1,000,000.00 combined single limit $1,000,000.00 each occurrence
Umbrella or Excess Liability	$5,000,000.00 each occurrence/aggregate
All Risk Builders Risk against the perils of fire, lightening, windstorm, hurricane, hail, explosion, riot, civil commotion, smoke, aircraft, land vehicles, vandalism, malicious mischief, and all other perils in the amount one hundred percent (100%) of the value of the improvements including transit and materials stored off site. Additionally, this coverage shall provide protection to the full replacement value for boiler and machinery equipment up to installation, during testing, and until acceptance by Owner.	
Professional Liability for Construction Manager-At-Risk. In addition to the coverage and limits provided above, if these General Conditions are incorporated into the AIA Document A133™–2019 Standard Form of Agreement Between Owner and Construction Manager as Constructor *where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price*, the Construction Manager shall also provide Professional Liability Insurance covering negligent acts, errors and omissions in the performance of professional services during the pre-construction phase, with policy limits of not less than One Million Dollars ($1,000,000.00) per claim and Two Million Dollars ($2,000,000.00) in the aggregate.	

§ 11.1.2 The required insurance must be written by a company licensed to do business in Texas at the time the policy is issued. In addition, the company must be acceptable to the Owner.

§ 11.1.3 The General Liability and Automobile policies so issued in the name of Contractor shall also name the Owner as additional insured. The coverage afforded to the additional insured under the policy or policies shall be primary insurance. It is the intent of the parties to this Agreement that the General Liability coverage (and associated Umbrella Coverage) required herein shall be primary to and shall seek no contribution from all insurance available to Owner,

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with Owner's insurance being excess, secondary and non-contributing. The Commercial General Liability coverage provided by Contractor shall be endorsed to provide such primary and non-contributing liability. If the additional insured has other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis.

§ 11.1.4 If the insurance is written with stipulated amounts deductible under the terms of the policy, the Contractor shall pay the difference attributable to deductions in any payment made by the insurance carrier on claims paid by this insurance. If the Owner is damaged by the failure of the Contractor to maintain such insurance and to so notify the Owner then the Contractor shall bear all reasonable costs properly attributable thereto.

§ 11.1.5 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents. Nothing contained herein shall limit or waive Contractor's legal or contractual responsibilities to Owner or others.

§ 11.1.6 Contractor shall have its insurance carrier(s) furnish to Owner insurance certificates in form satisfactory to Owner specifying the types and amounts of coverage in effect, the expiration dates of each policy, and a statement that no insurance will be canceled or materially changed while the Work is in progress without thirty (30) calendar day's prior written notice to Owner. Contractor shall permit Owner to examine the insurance policies, or at Owner's option, Contractor shall furnish Owner with copies, certified by the carrier(s), of insurance policies required in Section 11.1.1. If Contractor neglects or refuses to provide any insurance required herein, or if any insurance is canceled, Owner may, but shall not be obligated to, procure such insurance and the provisions of Section 11.1.8 hereof shall apply.

§ 11.1.7 Contractor and its Subcontractors shall not commence the shipment of equipment or materials or commence the Work at the site until all of the insurance coverage required of Contractor and its Subcontractors are in force and the necessary certificates and statements pursuant to Section 11.1.6 hereof have been received by Owner and the Architect has issued a written notice to proceed.

§ 11.1.8 As an alternative and at Owner's option and expense, Owner may elect to furnish or to arrange for any part or all of the insurance required by Section 11.1 hereof. If Owner so elects, it shall notify, in writing, Contractor and issue a Change Order therefor, but no adjustment to the scheduled completion date or the Contract Sum shall be allowed.

§ 11.1.9 Workers' Compensation Insurance Coverage.

.1 Definitions:

.1.1 Certificate of coverage ("Certificate"). A copy of a certificate of insurance, a certificate of authority to self-insure issued by the division, or a coverage agreement (DWC Form-81, DWC Form-82, DWC Form-83, or DWC Form-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on the Project, for the duration of the Project.

.1.2 Duration of the Project. Includes the time from the beginning of the work on the Project until the Contractor's work on the Project has been completed and accepted by the Owner.

.1.3 Persons providing services on the Project ("subcontractor" in Texas Labor Code §406.096). Includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person contracts directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the Project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a Project. "Services" does not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

.2 The Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor

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Code, Section 401.011(44) for all employees of the Contractor providing services on the Project, for the duration of the Project.

.3 The Contractor must provide a certificate of coverage to the Owner prior to being awarded the contract.

.4 If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the Project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the Owner showing that coverage has been extended.

.5 The Contractor shall obtain from each person providing Services on a Project, and provide to the Owner:

.5.1 a certificate of coverage, prior to that person beginning work on the Project, so the Owner will have on file certificates of coverage showing coverage for all persons providing services on the Project; and

.5.2 no later than seven (7) days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

.6 The Contractor shall retain all required certificates of coverage for the duration of the Project and for one (1) year thereafter.

.7 The Contractor shall notify the Owner in writing by certified mail or personal delivery, within ten (10) days after the Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.

.8 The Contractor shall post on each Project site a notice, in the text, form and manner prescribed by the Texas Department of Insurance, Division of Workers' Compensation, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

.9 The Contractor shall contractually require each person with whom it contracts to provide services on a Project, to:

.9.1 provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the Project, for the duration of the Project;

.9.2 provide to the Contractor, prior to that person beginning work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project, for the duration of the Project;

.9.3 provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

.9.4 obtain from each other person with whom it contracts, and provide to the Contractor:

(a) a certificate of coverage, prior to the other person beginning work on the Project; and

(b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

.9.5 retain all required certificates of coverage on file for the duration of the Project and for one (1) year thereafter;

.9.6 notify the Owner in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and

.9.7 contractually require each person with whom it contracts, to perform as required by Subparagraphs .9.1 - .9.7 with the certificates of coverage to be provided to the person for whom they are providing services.

.10 By signing this contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the Owner that all employees of the Contractor who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the Texas Department of Insurance, Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

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.11 The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor which entitles the Owner to declare the contract void if the Contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the Owner. [28 TAC §110.110(c)(7)]

§ 11.1.10 The Owner and Contractor shall waive all rights against (1) each other and the Contractors, Subcontractors, agents and employees each of the other, and (2) the Architect and separate Contractors, if any, and their contractors, Subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by property insurance applicable to the Work. The foregoing waiver afforded the Architect, his agents and employees shall not extend to the liability imposed by Section 3.18.3. The Owner or the Contractor, as appropriate, shall require of the Architect, separate contractors, contractors and Subcontractors by appropriate agreements, written where legally required for validity, similar waivers, each in favor of all other parties enumerated in this Section 11.1.10.

§ 11.2 Owner's Insurance [Paragraph Deleted.]

(Paragraphs deleted)

§ 11.3 Waivers of Subrogation [Paragraph Deleted.]

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

(Paragraphs deleted)

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor is required, as a condition precedent to the execution of the Contract, to execute a PERFORMANCE BOND in the form required by TEXAS STATUTES, in an amount equal to ONE HUNDRED PERCENT (100%) of the Contract Sum.

§ 11.4.2 The Contractor is required, as a condition precedent to the execution of the Contract, to execute a PAYMENT BOND in the form required by TEXAS STATUTES, in an amount equal to ONE HUNDRED PERCENT (100%) of the Contract Sum as security for payment of all persons performing labor and furnishing materials in connection with this Contract. (Bonding Company is to furnish such forms). All bonds shall name the Owner as additional obligee.

§ 11.4.3 The Payment and Performance Bond shall meet requirements of Chapter 2253 of the Texas Governmental Code. All bonds shall be issued by a surety company licensed, listed and authorized to issue bonds in the State of Texas by the Texas Department of Insurance. The surety company may be required by the Owner to have a rating of not less than "B" in the latest edition of Best's Insurance Reports, Property-Casualty. The surety company shall provide, if requested, information on bonding capacity, other projects under coverage and shall provide proof to establish adequate financial capacity for this Project. Should the bond amount be in excess of ten percent (10%) of the surety company's capital and surplus, the surety company issuing the bond shall certify that the surety company has acquired reinsurance, in a form and amount acceptable to the Owner, to reinsure the portion of the risk that exceeds ten percent (10%) of the surety company's capital and surplus with one or more reinsurers who are duly authorized and admitted to do business in Texas and that amount reinsured by an reinsurer does not exceed ten percent (10%) of the reinsurer's capital and surplus.

§ 11.4.4 The Sureties shall promptly file a signed copy of the Contract, Performance Bond, and Payment Bond with the Owner in full compliance with Chapter 2253 of the Texas Governmental Code or, in the case of a Construction Manager, as required by Section 14.3.3 of the AIA Document A133-2019.

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§ 11.4.5 All bonds will be reviewed by the Architect for compliance with the Contract Documents prior to execution of the contract. In the event that the Architect has any questions concerning the sufficiency of the bonds, the bonds will be referred to the Owner or the Owner's representative for review and decision.

§ 11.4.6 All bonds shall be originals. The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the Power-of-Attorney. The name, address, and telephone number of a contact person for the bonding company shall be provided.

§ 11.4.7 Upon the request in writing of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

§ 11.4.8 Bonds shall be signed by an agent resident in the State of Texas and the date of the bond shall be the date of execution of the contract. If at any time during the continuance of the contract, the surety of the Contractor's bonds becomes insufficient, Owner shall have the right to require additional and sufficient sureties which the Contractor shall furnish to the satisfaction of the Owner within ten (10) business days after notice to do so. In default thereof, the Contractor may be suspended, and all payment or money due to the Contractor withheld.

§ 11.4.9 By inclusion of this Section 11.4.8 in the Contract Documents, the surety which issues the bonds is hereby notified that the Owner, the Architect, and their agents and employees do not represent and will not be responsible for the surety's interests during the course of the Work. To protect its interests, the surety shall have the right to attend pay estimate meetings, review Applications for Payment when requested in writing by them, comment upon and make recommendations regarding payments, and inspect the Work in the presence of the Contractor and the Architect. By providing the bonds for the Work, the surety shall and hereby waives any cause of action against the Owner, the Architect, their agents and employees, for any loss suffered by the surety by reason of overpayment of any amounts to the Contractor, unless such is a direct result of a fraudulent or grossly negligent act committed by such party.

§11.5 Adjustment and Settlement of Insured Loss [Paragraph Deleted.]

(Paragraphs deleted)

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered prior to inspection, contrary to the Architect's request or to requirements specifically expressed in the Contract Documents or if any known deficiencies exist, it must, if requested by the Architect, be uncovered by the Contractor for the Architect's examination and be replaced at the Contractor's sole expense without change in the Contract Time. If the uncovered work is determined by the Architect upon inspection to be deficient or not in accordance with the Contract Documents, the uncovered Work which is deficient or not in accordance with the Contract Documents shall be corrected and covered at the Contractor's sole expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense. If the a request inspection of the Work prior to covering or including a requirement for inspection in the Contract Documents is within the Architect's standard of care and the Architect has failed to timely make such request or include the requirement in the Contract Documents, the Architect shall reimburse the Owner for the actual costs of uncovering and recovering such Work and additional costs of correction, if any, caused by covering the Work prior to inspection.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense and will be subject to offset by the Owner at Final Payment.

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§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Owner shall give such notice of the condition to the Contractor with reasonable promptness after discovery of the condition. The Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition in its non-conforming state. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor based on a breach of the warranty contained in this Section 12.2.2.1 providing for correction of Work during the one-year period. If the Contractor fails to correct nonconforming Work within a reasonable time during the period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.2.4 Upon request by the Owner and prior to the expiration of one (1) year from the date of Substantial Completion, the Architect will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 Contractor shall (i) re-execute any parts of the Work that fail to conform with the requirements of this Agreement that appear during the progress of the Work; (ii) remedy any defects in the Work due to faulty materials or workmanship which appear within a period of one (1) year from Substantial Completion of the Work hereunder, or within such longer period of time as may be set forth in the Drawings and Specifications or other Contract Documents; and (iii) replace, repair, or restore any parts of the Project or furniture, fixtures, equipment, or other items placed therein (whether by Owner or any other party) that are injured or damaged by any such parts of the Work that do not conform to the requirements of the Contract Documents or defects in the Work or by the negligent act of the Contractor or its employees, agents or subcontractors. The cost to Contractor of performing any of its obligations under this Section 12.2.6 to the extent not covered by insurance shall be borne by Contractor.

§ 12.2.7 The provisions of this Section 12.2 apply to Work done by Subcontractors of the Contractor as well as Work done directly by employees of the Contractor. The provisions of this Section 12.2.7 shall not apply to corrective Work attributable solely to the acts or omissions of any separate Contractor of Owner (unless Contractor is acting in such capacities). The cost to Contractor of performing any of its obligations under this Section 12.2.7 to the extent not covered by insurance shall be borne by Contractor.

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§ 12.2.8 If, however, Owner and Contractor deem it inexpedient to require the correction of Work damaged or not done in accordance with the Contract Documents, an equitable deduction from the Contract Sum shall be made by written agreement between Contractor and Owner. Until such settlement, Owner may withhold such sums as Owner deems just and reasonable from moneys, if any, due Contractor. The settlement shall not be unreasonably delayed by the Owner and the amount of money withheld shall be based on estimated actual cost to the Owner of the correction.

§ 12.2.9 Contractor's express warranties set out in this Article 12 shall be in addition to, and not in lieu of, any other warranties or remedies Owner may have under the Contract Documents, at law, or in equity for defective Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the laws of the State of Texas without regard to choice-of-law rules of any jurisdiction. The Contract is deemed performable entirely in the County in which the Project is located. Any litigation to enforce or interpret any terms of the Contract, or any other litigation arising out of or as a result of the Contract, shall be brought in the State courts of said County. No provision of this Agreement shall waive any immunity or defense.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract in whole or in part without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender or other entity providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.2.3 The invalidity of any part or provision of the Contract Documents shall not impair or affect in any manner whatsoever the validity, enforceability, or effect of the remainder of the Contact Documents.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made at appropriate times as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities having jurisdiction. Except for tests, inspections and approvals required to be provided by the Contractor in the Contract Documents, the Owner will contract for, independently of the Contractor, the inspection services, the testing of construction materials engineering, and the verification testing services necessary for the acceptance of the Work by the Owner. The Contractor shall give timely notice to the persons or entities selected by the Owner of the need for such services. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

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§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense. Architect, Owner and Contractor shall cooperate for the timely scheduling of such tests and inspections.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including but not limited to those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Undisputed payments due and unpaid under the Contract Documents shall bear interest in accordance with the Texas Prompt Payment Act, Texas Gov't Code Chapter 2251. Any such payment shall be deemed overdue on the thirty-first (31st) day after Owner receives the Contractor's Certificate for Payment from the Architect, if Owner's Board of Trustees meets more than once per month. Any such payment shall be deemed overdue on the forty-sixth (46th) day after Owner receives the Contractor's Certificate for Payment from the Architect, if Owner's Board of Trustees meets once a month or less frequently. No interest shall be due on sums properly retained by Owner, except as provided by law, or on disputed sums unpaid by Owner.

§ 13.6 Equal Opportunity In Employment

§ 13.6.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, age, disability, sex, national origin, or any class otherwise protected by the Owner's policy or law. The Contractor agrees to post in conspicuous places, available to employees and applicants, notices setting forth the Contractor's nondiscrimination policies.

§ 13.6.2 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, age, disability, sex, national origin, or any class otherwise protected by the Owner's policy or law.

§ 13.7 Contractors Records

§ 13.7.1 Contractor agrees to furnish Owner such information as may be available in Contractor's files and records for the Project for the purpose of aiding Owner in establishing a depreciation schedule for the Project or such portions thereof as Owner may determine.

§ 13.7.2 Contractor shall at all times through the date of Final Completion, maintain Job Records, including, but not limited to, invoices, payment records, payroll record, daily reports, diaries, logs, instructions, drawings, receipts, contracts, purchase orders, vouchers, memoranda, other financial data and job meeting minutes applicable to the Project, in a manner which maintains the integrity of the documents. Job Records must be retained by Contractor for at least twelve (12) years after the date of Final Completion of the Project. Within ten (10) days of Owner's request, Contractor shall make such Job Records available for inspection, copying and auditing by the Owner, Architect or their respective representatives, at Owner's central office or the principal offices of the Contractor, at the sole option of the Owner.

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§ 13.7.3 For all Change Orders, Allowances and expenditures from Contingency Funds, Contractor shall also maintain, in accordance with the provisions of Section 13.9.1, the following: contract files, including proposals of successful and unsuccessful bidders, bid recaps and contractor payments; original estimates; estimating Work sheets; general ledger entries detail cash and trade discounts received; insurance rebates and dividends; and any other supporting evidence deemed necessary by the Owner to substantiate charges related to the Contract.

§ 13.7.4 Contractor shall keep a full and detailed financial accounting system and shall exercise such controls as may be necessary for proper financial management under this Contract; the accounting and control system shall be satisfactory to the Owner and shall be subject to the provisions of Section 13.7.1.

§ 13.7.5 Contractor shall keep all Construction Documents related to the Project, provided, however, Contractor shall not destroy said documents until Contractor has confirmed with Owner in writing that Owner has obtained a copy of all as-built drawings.

§ 13.7.6 In the event that an audit by the Owner reveals any errors/overpayments by the Owner, then the Contractor shall refund to the Owner the full amount of such overpayment within thirty (30) days of such audit findings, or the Owner, as its option, reserves the right to deduct such amounts owed to the Owner from any payments due to the Contractor.

§ 13.8 No Third-Party Beneficiaries

There are no third-party beneficiaries to this agreement.

§ 13.9 Proprietary Interests And Confidential Information

§ 13.9.1 Neither Architect nor Contractor shall use the image or likeness of Owner's Project or Owner's official logo or emblem and any other trademark, service mark, or copyrighted or otherwise protected information of Owner, without Owner's prior written consent. Contractor and Architect shall not have any authority to advertise or claim that Owner endorses Architect or Contractor's services, without Owner's prior written consent.

§ 13.9.2 Neither Architect nor Contractor shall disclose any confidential information of Owner which comes into the possession of Architect or Contractor at any time during the Project, including but not limited to: pending real estate purchases, exchange, lease, or value; information related to litigation; detailed layouts of the Owner's Facilities; the location and deployment of security devices; security access codes; student likenesses; student record information; employee information; or any other information deemed confidential by law.

§ 13.9.3 The parties acknowledge that, as a public entity in the State of Texas, Owner is subject to, and must comply with, the provisions of the Texas Public Information Act, Texas Government Code Section 552.001, *et seq.*, and the Texas Open Meetings Act, Texas Government Code, Section 551.001, *et seq.*

§ 13.10 The invalidity of any part or provision of the Contract Documents shall not impair or affect in any manner whatsoever the validity, enforceability or effect of the remainder of the Contract Documents.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 If the Work is stopped for a period of thirty (30) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor for any of the reasons set forth below, the Contractor may terminate the Contract upon twenty (20) days written notice to Owner and Architect if the Work is not allowed to commence within such period. The sole grounds for termination under this Subsection 14.1.1 are as follows:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;

.3 Because the Owner has not made payment of undisputed sums due on an approved Certificate for Payment within the time stated in the Contract Documents; or

.4 [Subsection Deleted.]

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§ 14.1.2 If through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less, the Contractor may terminate the Contract so long as Contractor has provided Owner and Architect with written notice of its intent to terminate in the event of additional delays of not less than twenty (20) days and has furnished written notice of termination to Owner and Architect no less than seven (7) days prior to the effective date of termination.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment in an amount which would have been recoverable had the termination been for the Owner's convenience.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon ten (10) additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- **.2** fails to make payment to Subcontractors or suppliers for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- **.3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- **.4** fails to proceed continuously and diligently with the construction and completion of the Work; except as permitted under the Contract Documents;
- **.5** fails to furnish the Owner, upon written request, with assurances satisfactory to the Owner, evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents;
- **.6** engages in or permits serious or repeated worker misconduct in violation of Article 3.3;
- **.7** engages in conduct that would constitute a violation of state or federal criminal law, including but not limited to, the laws prohibiting certain gifts to public servants, or engages in conduct that would constitute a violation of the Owner's ethics or conflict of interest policies; or
- **.8** otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, subject to any prior rights of the surety, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- **.1** Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- **.2** Accept assignment of subcontracts pursuant to Section 5.4; and
- **.3** Finish the Work by whatever reasonable method the Owner may deem expedient.

In any such event, title to the Work and any products thereof, whether completed or partially completed, as well as all materials prepared, procured or set aside by the Contractor for use in the Work, shall vest in the Owner at the Owner's option, and the Owner may enter the Contractor's premises and remove the same therefrom. No election hereunder shall be construed as a waiver of any rights or remedies of the Owner with regard to any breach of the Contract Documents.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. Any further payment shall be limited to amounts actually earned to the date of termination.

§ 14.2.4 If the costs of finishing the Work, including compensation for the Architects' services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, exceed the unpaid balance of

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the Contract Sum or Guaranteed Maximum Price (if the Project is a Construction Manager at Risk project), then the Contractor and/or its Surety shall pay the difference to the Owner. The amount to be paid to the Owner shall be certified by Architect upon application. The obligation for payment shall survive termination of the Contract.

§ 14.2.5 The parties hereby agree that: 1) if an order for relief is entered on behalf of the Contractor, pursuant to Chapter 11 of the U.S. Bankruptcy Code; 2) if any other similar order is entered under any debtor relief laws; 3) if Contractor makes an assignment for the benefit of one or more of its creditors; 4) if a receiver is appointed for the benefit of its creditors; or 5) if a receiver is appointed on account of its insolvency, any such event could impair or frustrate Contractor's performance of the Contract Documents. Accordingly, it is agreed that upon occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions of the Contract Documents. Failure to comply with such request within ten (10) days of delivery of the request shall entitle Owner to terminate the Contract and to the accompanying rights set forth in Subparagraphs 14.2.1 through 14.2.6. In all events, pending receipt of adequate assurance of performance and actual performance in accordance with the Contract Documents, Owner shall be entitled to proceed with the Work with Owner's own forces or with other Contractors on a time and material or other appropriate basis, the cost of which will be charged against the Contract Sum.

§ 14.2.6 As required by Texas Government Code Chapter 2253, if a Performance Bond has been furnished and the Contractor is declared by the Owner to be in default under the Contract, then the Surety shall promptly perform the Work, in full accordance with the plans, specifications and Contract Documents. Unless otherwise agreed in writing between the Surety and the Owner, the Surety shall complete the Work by the Surety entering into a Contract acceptable to Owner, with a Contractor acceptable to Owner, and shall obtain new Payment and Performance Bonds as required by law.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time may be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. No adjustment shall be made to the extent

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. Furthermore, if this Contract is a multi-year contract funded through Owner's current general funds that are not bond funds, then the Owner's Board of Trustees has the right to not appropriate adequate monies for the next fiscal year and to terminate this Contract at the end of each fiscal year during the term of the Contract, without the Owner incurring any further liability to Contractor as a result of such termination.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed, for profit only on that portion of the Work executed, and reasonable costs of demobilization.

§ 14.4.4 Upon determination by a Court of competent jurisdiction that termination of the Contractor pursuant to Section 14.2 was wrongful, such termination will be deemed converted to a termination for convenience pursuant to Section 14.4, and Contractor's remedy for wrongful termination shall be limited to the recovery of the payments permitted for termination for convenience as set forth in this Section 14.4.3.

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ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims [Paragraph Deleted.]

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by the Contractor, shall be initiated by notice to the Owner and to the Architect, Claims under this Section 15.1.3.1 shall be initiated within 21 calendar days after the occurrence of the event giving rise to such Claim or within 21 calendar days after the claimant first knew or should have known of the condition giving rise to the Claim, whichever is earlier. If the full impact cannot be assessed as of the date of the Notice, then Notice shall be provided and amended by a second notice at the earliest date that is reasonably possible, but in no event later than the date of Contractor's Application for Payment covering the period in which the impact can be assessed and quantified.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required. If Texas Government Code, Chapter 2272 is applicable to the Claim, the Owner shall comply with the requirements set out therein as a condition precedent to any initiation of any litigation.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make undisputed payments for Work performed in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum (or Guaranteed Maximum Price, as applicable), if permitted, and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of the Contractor to proceed in accordance with this Article 15.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum (provided such a claim is specifically permitted by the Contract Documents), notice as provided in Section 15.1.3 shall be given to the Owner and Architect. before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4. The Architect will promptly investigate such Claim and report findings and a recommended resolution in writing to the Owner and Contractor. If the Claim is approved by Owner, then Contractor shall proceed with the execution of the Work that is the subject matter of the Claim. If the Claim is rejected by the Owner, then Contractor may pursue alternative dispute resolution as provided for in the Contract Documents.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions occurred at the locality of the Work which were abnormal for the period of time, were in excess of that normally experienced at the job site, could not have been reasonably anticipated, and prevented the execution of Work on scheduled Working Days. The term "Adverse Weather Conditions" as used herein means unusually severe weather which is beyond the normal weather recorded and expected for the locality of the Work and/or the season or seasons of the year. Normal weather conditions shall be determined based upon information compiled from the Local Climatological Data maintained by NOAA's National Centers for Environmental Information [formerly the National Climatic Data Center (NCDC)] from the station closest to the

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location of the Work. No day will be counted as a rain-day when substantial Contractor forces are able to perform Work on the Project for more than fifty percent (50%) of the usual workday or when the stage of the Work on the Project is not adversely impacted. The Contractor shall bear the entire economic risk of all weather delays and disruptions, and shall not be entitled to any increase in the Contract Price by reason of such delays or disruptions. Requests for an extension of the Contract Time pursuant to this Subparagraph shall be submitted to the Architect not later than the fifteenth (15th) day of the month following the month during which the delays or disruptions occurred, but shall be applied only to the extent that Substantial Completion of the Project exceeds the Substantial Completion date established for the Work. As provided herein, Contractor shall only be entitled an extension of the Contract Time per the terms of the Contract Documents and no damages shall be paid for delays.

(Paragraphs deleted)

§ 15.1.7 Calculating Claims For Damages

Except as otherwise provided in this Agreement, in calculating the amount of any Claim recoverable by the Contractor, the following standards will apply:

.1 No indirect or consequential damages will be allowed.

.2 No recovery shall be based on a comparison of planned expenditures to total actual expenditures, or on estimated loss of labor efficiency, or on a comparison of planned manloading to actual manloading, or any other analysis that is used to show damages indirectly.

.3 Damages are limited to extra costs specifically shown to have been directly caused by a proven wrong.

.4 No damages will be allowed for home office overhead or other home office changes or any Eichleay formula calculation.

Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents, nor will this Section 15.1.7 be deemed to apply to delay damages, which are prohibited entirely.

§ 15.2 Initial Decision

§ 15.2.1 Claims by the Contractor against the Owner, including those alleging an error or omission by the Architect but excluding those arising under Section 10.3, shall be referred initially to the Architect for consideration and recommendation to the Owner. An initial recommendation by the Architect shall be required as a condition precedent to mediation of any Claim, after the Claim has been referred to the Architect with no recommendation having been rendered by the Architect.

§ 15.2.2 The Architect will review Claims and within ten (10) days of receipt of the Claim take one or more of the following actions: (1) request additional supporting data from the Contractor; (2) issue an initial recommendation; (3) suggest a compromise; or (4) advise the parties that the Architect is unable to issue an initial recommendation due to a lack of sufficient information or conflict of interest.

§ 15.2.3 Following receipt of the Architect's initial recommendation regarding a claim, the Owner and Contractor shall attempt to reach agreement as to any adjustment to the Contract Price and/or Contract Time. If no agreement can be reached either party may request mediation of the dispute pursuant to Article 15.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished.

§ 15.2.5 [Paragraph Deleted.]

§ 15.2.6 [Paragraph Deleted.]

§ 15.2.6.1 [Paragraph Deleted.]

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

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§ 15.2.8 Waiver Of Lien

It is distinctly understood that by virtue of this Contract, no mechanic, contractor, materialman, artisan, or laborer, whether skilled or unskilled, shall ever in any manner have, claim, or acquire any lien upon the building, or any of the improvements of whatever nature or kind so erected or to be erected by virtue of this Contract nor upon any of the land upon which said building or any of the improvements are so erected, built, or situated.

§ 15.3 Mediation

§ 15.3.1 In the event that the Owner or the Contractor shall contend that the other has committed a material breach of this Agreement, the party alleging such breach shall, as a condition precedent to filing any lawsuit, request mediation of the dispute. Mediation shall be subject to and in accordance with Chapter 154 of the Texas Civil Practice & Remedies Code. Mediation shall be conducted by a mutually-agreed-upon mediator qualified as an impartial third party for purposes of Section 154.052 of the Texas Civil Practice & Remedies Code.

§ 15.3.2 Request for mediation shall be in writing, and shall request that the mediation commence not less than thirty (30) or more than ninety (90) days following the date of the request, except upon agreement of both parties.

§ 15.3.3 In the event the Owner and the Contractor are unable to agree to a date for the mediation or to the identity of the mediator or mediators within thirty (30) days following the date of the request for mediation, all conditions precedent in this article shall be deemed to have occurred.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.3.5 Nothing herein shall preclude the Owner or the Contractor or as applicable, the Construction Manager from requesting that the Architect or one or more subcontractors be joined as parties to the mediation, to the extent allowed by their respective contracts.

§ 15.3.6 Any claim not resolved in mediation pursuant to Section 15.3 shall be subject to litigation as the sole method of dispute resolution.

§ 15.3.7 Unless otherwise agreed in writing by the Owner in the Owner's sole discretion, the Contractor may not bring a legal action against the Owner unless:

.1 the Contractor has given written notice to the Owner of the Claim, dispute, or other matter giving rise to the legal action within ninety-one (91) days after the date of the start of the event giving rise to the Contractor's Claim, dispute or other matter, and

.2 the legal action is brought within two (2) years and one (1) day after the date of the start of the event giving rise to Contractor's Claim, dispute or other matter.

§ 15.4 Arbitration. This Section 15.4 and all subparts are intentionally deleted. No dispute arising under the Contract Documents, these General Conditions or the underlying Contract shall be subject under any circumstances to Arbitration as the method of binding dispute resolution and Owner rejects any selection otherwise made by the parties.

§ 15.5 Immunity

Contractor stipulates that Owner is a political subdivision of the State of Texas and, as such, may enjoy immunities from suit and liability under the Constitution and laws of the State of Texas. By entering into this Agreement, Owner does not waive any of its immunities from suit and/or liability, except as otherwise specifically provided herein and as specifically provided by law.

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This Agreement entered into as of the _____ day of _____, 2025.

CALALLEN INDEPENDENT SCHOOL DISTRICT **EXHIBIT TO BID PACKAGE ONLY – NOT FOR SIGNATURE AT THIS TIME**		COMPANY: _____ **EXHIBIT TO BID PACKAGE ONLY – NOT FOR SIGNATURE AT THIS TIME**
OWNER *(Signature)*		CONTRACTOR *(Signature)*
Emily Lorenz Superintendent of Schools Email: elorenz@calallen.org		Name: _____ Title: _____ Email: _____
(Printed name and title)		*(Printed name and title)*

(Paragraphs deleted)

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DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME

...

Calallen Independent School District: Calallen High School Stadium Improvements Project (2024 Bond) located at Phil Danaher Stadium 4001 Wildcat Drive, Corpus Christi, Texas 78410

...

Calallen Independent School District, a political subdivision and public school district of the State of Texas
4205 Wildcat Drive
Corpus Christi, Texas 78410
Phone: (361)242-5600
~~THE ARCHITECT:~~
THE ARCHITECT*:
(Name, legal status and address)

Rawley McCoy and Associates, PLLC, a professional limited liability company of the State of Texas
1908 N. Laurent Street, Suite 540
Victoria, Texas 77901
Phone: (361) 573-1642
THE CONTRACTOR

DRAFT FOR PROCUREMENT – EXHIBIT ONLY AT THIS TIME

_____, a _____ of the State of _____
[Address]
[Address continued]
Phone: _____
E-mail: _____

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15 CLAIMS AND DISPUTES

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The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, Project Manual and the Bid or Proposal Documents prepared and submitted by the Owner and the Contractor's Bid or Proposal submitted by the Contractor, to the extent they do not conflict with the terms of this Agreement, and other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements. The Contract Documents identified in this Section shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations. In the absence of individual signatures by Owner and Contractor, the Contract Documents identified in the signed contract prevail.

...

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. ~~The Contract may~~ After execution of the Original Contract Documents, the Contract may thereafter be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.
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§ 1.1.9 The terms "bids" or "bidding" shall include any kind of competitive purchasing under the Texas Education Code Chapter 44 and Texas Government Code Chapter 2269.

§ 1.1.10 Miscellaneous Other Words
§ 1.1.10.1 Business Day
The term "business day" is a day the Owner's Administration Building is scheduled to be open for normal business purposes, unless closed by the Owner's Superintendent of Schools for inclement weather or other reason. Days on which the Administration Building is normally closed are Thanksgiving Break, Winter Break, Spring Break, and Summer Break, as well as other federal, state or local days specified in the calendar approved by the Owner's Board of Trustees on an annual basis. A business day does not include a day on which the Owner's Administration Building is open only for the purposes of conducting candidate filing, early voting, elections, or special events.

§ 1.1.10.2 Calendar Day
A calendar day is a day on the Gregorian calendar. The Contact Time is established in calendar days. Extensions of time granted, if any, will be converted to calendar days.

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§ 1.1.10.3 Holidays

Owner approved holidays for Contractor's Work are limited to New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

§ 1.1.10.4 Work Day

Work days include all calendar days except Holidays, Saturdays and Sundays.

...

§ 1.2.1.2 During the course of the Work, should any conflict be found in or between the Contract Documents, the Contractor shall be deemed to have included in the cost of the Work the greater quantity or better quality, or the most stringent requirements, unless Contractor shall have obtained, before the submission of Contractor's Proposal, an interpretation in writing from the Architect as to what shall govern. The Architect, in case of such conflict, may interpret or construe the document so as to obtain the most substantial and complete performance of the Work consistent with the Contract Documents and reasonably inferable therefrom, in the best interests of Owner, and the Architect's interpretation shall be final. The terms and conditions of this clause shall not relieve any party of any other obligation under the Contract Documents.

...

§ 1.2.4 Precedence Of The Contract Documents

The most recently issued Document takes precedence over previous issues of the same Document. The order of precedence is as follows with the highest authority listed as "1".

.1 Contract Modifications signed by Contractor and Owner.

.2 Addenda, with those of later date having precedence over those of earlier date.

.3 General Conditions - AIA Document A201-2017, as modified by the Owner for the Project.

.4 Specifications and Drawings.

.5 Agreement – AIA Document A101-2017 or A133-2019, as modified by the Owner for the Project.

.6 Bid/Proposal Documents including the Project Manual, Contractor's Bid or Proposal Documents (to the extent such Bid or Proposal submitted by the Contractor is part of the Contract Documents and is not inconsistent with other portions of the Contract Documents)

§ 1.2.5 Relation Of Specifications And Drawings

Specifications and Drawings are to be equivalent in authority and priority. Should they disagree in themselves, or with each other, prices shall be based on the better quality and greater quantity of Work indicated. In the event of the above-mentioned disagreements, the resolution shall be determined by the Architect.

§ 1.2.5.1 Drawings and Specifications are to be equivalent in authority and priority. Should they disagree in themselves, or with each other, prices shall be based on the better quality and greater quantity of Work indicated. In the event of the above-mentioned disagreements, the resolution shall be determined by the Architect.

§ 1.2.5.2 Where, in the Drawings and Specifications, certain products, manufacturer's trade names, or catalog numbers are given, it is done for the express purpose of establishing a standard of function, dimension, appearance, and quality of design, in harmony with the Work, and is not intended for the purpose of limiting competition. Materials or equipment shall not be substituted unless such substitution has been specifically accepted for use on this Project by the Architect.

§ 1.2.5.3 When the Work is governed by reference to standards, building codes, manufacturer's instructions, or other documents, unless otherwise specified, the current edition as of the Agreement date shall apply.

§ 1.2.5.4 Requirements of public authorities apply as minimum requirements only and do not supersede more stringent specified requirements.

Terms capitalized in these General Conditions include those that ~~are~~ are: (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

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In the interest of ~~brevity~~ brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

...

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered (whether actually received or not) when deposited with the United States Postal Service, postage prepaid, certified mail, return receipt requested, and addressed to the intended recipient at the address shown in this Agreement. Notice may also be given in person, by mail, by courier, or by electronic transmission if a method for electronic transmission ~~is set forth in the Agreement.~~(e-mail or facsimile) or other commercially reasonable means and will under any of these circumstances, be effective when actually received. Any address for notice may be changed by written notice delivered as provided in this Section 1.6.

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The parties shall agree upon ~~written~~ protocols governing the transmission and use ~~of, and reliance on,~~ of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit or such other form agreed to by the parties, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

~~Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.~~[Paragraph Deleted.]

...

§ 2.1.1 The Owner is the ~~person or entity identified as such in the Agreement~~ Board of Trustees of the Calallen Independent School District and is referred to throughout the Contract Documents as if singular in number. The Owner ~~shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization.~~ may designate in writing one or more persons to represent the Owner; however, such representatives shall have the authority to bind the Owner only to the extent expressly authorized by the Owner and shall have no implied authority. Except as otherwise provided in Section 4.2.1, the Architect does not have ~~such authority.~~ the authority to bind the Owner. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner ~~shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.~~may engage a third-party consultant to represent the Owner. The Owner will notify the Contractor of the identity of such consultant.

§ 2.1.3 The Contractor acknowledges that no lien rights exist with respect to public property.

...

§ 2.2.1 ~~Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.~~Pursuant to the requirements of Texas Business and Commerce Code section 56.054(e)(3), the Owner represents that funds are available and have been authorized for the full contract amount of the Work.

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§ 2.2.2 ~~Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.~~[Paragraph Deleted.]

§ 2.2.3 ~~After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.~~[Paragraph Deleted.]

§ 2.2.4 ~~Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.~~[Paragraph Deleted.]

...

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor ~~to whom the Contractor has no reasonable objection and~~ whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner ~~shall~~ may furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the ~~site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.~~site, but shall have no duty to do so. Notwithstanding the foregoing, if the Owner provides such survey, the Contractor shall remain responsible to independently investigate the physical characteristics, legal limitations, and utility locations for the Project site. In the event that the Contractor damages any utilities during construction, the Contractor shall immediately repair the same at its sole cost and expense.

§ 2.3.5 ~~The Owner shall furnish information~~ Information or services required of the Owner by the Contract Documents ~~with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.~~shall be furnished by the Owner within a reasonable time following actual receipt of a written request.

§ 2.3.6 ~~Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.~~The Contractor, Owner and Architect shall agree on an appropriate quantity of drawings and specifications to be printed and distributed for bidding purposes. The drawings shall be provided by the Architect and paid for by the Owner.

§ 2.3.7 Owner's personnel or consultant may, but are not required to be present at the construction site during progress of the Work to assist the Architect in the performance of his duties, and to verify the Contractor's record of the number of workmen employed on the Work, their occupational classification, the time each is engaged in the Work, and the equipment used in the performance of the Work for purpose of verification of Contractor's Applications for Payment.

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§ 2.3.8 The Owner (either directly or by contract with the Architect) may furnish tests, inspections, and reports, required by law and as otherwise agreed to by the parties, such as structural, mechanical, and chemical tests, tests for air and water pollution, and tests for hazardous materials.

§ 2.3.9 The Owner, (directly or by contract with the Architect), when such services are required, in the professional opinion of the Architect, shall furnish services of geotechnical engineers, which may include test borings, test pits, determinations of soil bearing values, percolation tests, evaluations of hazardous materials, seismic evaluation, ground corrosion tests and resistivity tests, including necessary operations for anticipating subsoil conditions, with written reports and appropriate recommendations.

If the Contractor fails to correct Work that is defective or not in accordance with the requirements of the Contract Documents as required by ~~Section 12.2 or repeatedly~~ Section 12.2, fails to timely carry out Work in accordance with the Contract ~~Documents,~~ Documents or is in default of any of its material obligations hereunder, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or ~~entity, except to the extent required by Section 6.1.3.~~entity.. This right shall be in addition to, and not in restriction of, the Owner's right under Section 12.2.

...

~~If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.~~§ 2.5.1 If the Contractor is in default in any of its material obligations hereunder, neglects to timely carry out the Work in accordance with the Contract Documents, or fails to correct nonconforming or defective Work as required by Section 12.2, and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or such non-conforming or defective Work with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or such non-conforming or defective Work at the sole cost of the Contractor. The Architect may, pursuant to Section 9.5.1, withhold or nullify the Contractor's Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such default or such non-conforming or defective Work, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure to correct such non-conforming or defective Work. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

§ 2.5.2 Nothing contained in this Section 2.5 is intended to limit or modify any obligations under the law or under the Contract Documents, including any warranty obligations, expressed or implied.

...

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be authorized to do business in the state of Texas and lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative, or in the case of a Construction Manager-at-Risk, the Construction Manager-at-Risk, or its authorized representative.

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§ 3.1.2 The Contractor shall perform the Work in a good and workmanlike manner and accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Owner or Owner's consultants, if applicable, conducted in accordance with the Contract Documents or activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.
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§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. The Contractor and each Subcontractor shall evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including without limitation: (1) the location, condition, layout and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools and equipment, and (5) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site, or for price escalations in the marketplace. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or Contract Time in connection with any failure by the Contractor or any Subcontractor to comply with the requirements of this Section.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. Contractor shall not perform any Work it knows involves an error, inconsistency, or omission without further instructions to Contractor or revised Construction Documents from the Architect. The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the Work installed by other contractors, is not guaranteed by the Architect or the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other Work, it shall verify at the site all dimensions relating to such existing or other Work. Any errors due to the Contractor's failure to so verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require. If the Contractor has knowledge that any of the products or systems specified will perform in a manner that will limit the Contractor's ability to satisfactorily perform the Work or honor its warranty, or will result in a limitation of or interference with the Owner's intended use, then the Contractor shall promptly notify the Architect and Owner, in writing providing substantiation for its position.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article ~~15.~~15; however, nothing in this section shall provide the Contractor with an affirmative claim for damages for delay by Owner or Architect, as such a claim is prohibited under this Contract. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the

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Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 Notwithstanding the delivery of a survey or other documents by the Owner, Contractor shall use reasonable efforts to perform all Work in such a manner so as to avoid damaging any utility lines, cables, pipes, or pipelines on the property. Contractor shall be responsible for, and shall repair at Contractor's own expense, any damage done to lines, cables, pipes, and pipelines identified to Contractor.

§ 3.2.6 The Owner and Contractor agree that the Contract Documents may not be free from errors, inconsistencies, or omissions, and further agree that the Owner makes no warranty as to the completeness or accuracy of the Contract Documents, either express or implied. Execution of the Contract by the Contractor is a representation that the Contractor has thoroughly reviewed and become familiar with the Contract Documents and that the Contractor is not aware of any errors, inconsistencies or omissions in the Contract Documents which would delay the Contractor in the performance of the Contract Work. The Contractor shall not be entitled to any damages or increase in the Contract Amount due to delays or disruptions to the Work. This limitation on damages is further subject to the limitations set forth in Section 15.1.7.

§ 3.2.7 The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for the Architect to evaluate and respond to the Contractor's request for information, where such information was available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner provided information, Contractor prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.2.8 The Contractor shall use the AIA Document G716-2004 "REQUEST FOR INFORMATION" (RFI) form unless otherwise provided in the Contract Documents. The Contractor shall keep a log of all RFI's submitted and number the RFI's consecutively beginning with the number 1.

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§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall assign a Superintendent who shall make decisions on behalf of the Contractor and its subcontractors. The Superintendent shall be on the Project, in this capacity, at all times while Work on the Project is in progress. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect, and shall propose ~~alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its~~ alternative means, methods, techniques, sequences, or procedures.

...

§ 3.3.4 Contractor shall bear responsibility for design and execution of acceptable trenching and shoring procedures, in accordance with Texas Government Code, Section 2166.303 and Texas Health and Safety Code, chapter C, Sections 756.021, *et seq.*, and shall require any applicable subcontractor to comply all such procedures. Trench excavation safety protection shall be a separate pay item, and shall be based on linear feet of trench excavated. Special shoring requirements shall also be a separate pay item, and shall be based on the square feet of shoring used.

§ 3.3.5 It is understood and agreed that the relationship of Contractor to Owner shall be that of an independent Contractor. Nothing contained herein or inferable herefrom shall be deemed or construed to (1) make Contractor the agent, servant, or employee of the Owner, or (2) create any partnership, joint venture, or other association between Owner and Contractor. Any direction or instruction by Owner in respect of the Work shall relate to the results the Owner desires to obtain from the Work, and shall in no way affect Contractor's independent contractor status as described herein.

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§ 3.3.6 The Contractor shall review contractor safety programs, procedures, and precautions in connection with performance of the Work. However, the Contractor's duties shall not relieve any Subcontractor(s) or any other person or entity (e.g. a supplier) including any person or entity with whom the Contractor does not have a contractual relationship, of their responsibility or liability relative to compliance with all applicable federal, state and local laws, rules, regulations, and ordinances which shall include the obligation to provide for the safety of their employees, persons, and property and their requirements to maintain a work environment free of recognized hazards. The foregoing notwithstanding, the requirements of this Section are not intended to impose upon the Contractor any additional obligations that the Contractor would not have under any applicable state or federal laws including, but not limited to, any rules, regulations, or statutes pertaining to the Occupational Safety and Health Administration.

§ 3.3.7 Contractor acknowledges that the Work may be performed in connection with an educational facility which is currently occupied and in use. It is imperative that Contractor's operations and the performance of the Work not interfere with, interrupt, disturb, or disrupt Owner's normal operations or facilities. Contractor agrees to and shall comply with all rules, regulations and requirements of the Owner and the school campus on which the Work is to be performed, and shall take all steps necessary to protect and guard the safety of the employees, students and invitees of Owner. Contractor shall exercise the utmost skill and judgment to ensure that continuing construction activity will not interfere with the use, occupancy and quiet enjoyment of facilities in use on the site. Contractor recognizes that the ongoing activities in proximity with its construction activities shall result in the need for prompt and effective coordination of its services with those involved in the ongoing utilization of the premises. Such coordination and adequate site access shall be the responsibility of Contractor. Contractor understands and accepts the difficulties and costs associated with working in an existing facility and the potential delays and disruptions in its Work and has included such items in the Contract Time and the Contract Sum. The Contractor shall perform all the Work in such a manner as to cause minimum interference with the operations of the Owner and other contractors and Subcontractors on the site, and shall take, and cause the Contractor's and its Subcontractor's employees, agents, licensees and permittees to take all necessary precautions to protect the Work and the site and all persons and property thereon from damage or injury.

§ 3.3.8 Representatives of the Owner, Contractor, and Architect shall meet periodically at mutually agreed upon intervals, for the purpose of establishing procedures to facilitate cooperation, communication, and timely responses among the participants. By participating in this arrangement, the parties do not intend to create additional contractual obligations or modify the legal relationships which may otherwise exist.

§ 3.3.9 The Contractor shall pay fees for public or private water, gas, electrical and other utility service at the site until Substantial Completion of the Work. In the event that the Work will be conducted at an Owner site, where utility services are existing on site and reasonably accessible to the Contractor, the Owner may elect, in writing, to provide and pay for utility service for the Project site. Agreement to pay for such utility service shall not absolve the Contractor from using utilities judiciously in connection with its performance of the Work. In all cases, the Contractor shall secure and arrange for all necessary utility connections.

§ 3.3.10 The Owner may require that the Contractor use and/or respond to certain Owner-furnished forms or inquiries during the course of the Project. From time to time, there may be future revisions, changes, additions or deletions to these forms. The fact that the Owner modifies and increases reasonable reporting requirements shall not serve as the basis for a claim for additional time or compensation by the Contractor.

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for qualified, careful, and efficient workers and labor, eligible to work in accordance with state and federal law. Contractor shall appropriately classify all workers in accordance with the Fair Labor Standards Act, its implementing regulations, and Texas Labor Code Section 214.008. In addition, unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Before ordering any material or doing any Work, Contractor shall verify all dimensions and check all conditions in order to assure Contractor that they are the same as those in the Drawings, Specifications, and other Construction Documents. Any inconsistency shall be brought to the attention of the Architect. In the event that discrepancies occur between ordered material and actual conditions and Architect was not notified beforehand, then costs to correct such discrepancies shall be borne by Contractor. In accordance with Texas Government Code §2269.054, these Contract Documents shall not be construed to deny or diminish the right of any person to work because of the person's membership or other

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relationship status with respect to any organization. In accordance with Texas Government Code §2269.0541, these Contract Documents shall also not prohibit, require, discourage or encourage a person, or discriminate against a person bidding on this contract from entering into or declining to enter into, or adhering to, an agreement with a collective bargaining organization relating to this Project.

~~§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.~~

§ 3.4.2 Prevailing Wages

§ 3.4.2.1 The Project is subject to the Texas Government Code, Chapter 2258, Prevailing Wage Rates. This statute requires the Contractor and any Subcontractor to pay not less than the prevailing rates of per diem wages in the locality at the time of construction to all laborers, workmen, and mechanics employed by them in the execution of the contract.

§ 3.4.2.2 In accordance therewith, the Owner has established a scale of prevailing wages which is incorporated in the Project specifications, and not less than this established scale must be paid on the Project. Any workers not included in the schedule shall be properly classified and paid not less than the rate of wages prevailing in the locality of the Work at the time of construction.

§ 3.4.2.3 A Contractor or Subcontractor who violates the provisions of Sections 3.4.2.1 or 3.4.2.2 shall pay to Owner the sum of Sixty Dollars and No/100 ($60.00) for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rate stipulated in the scale of prevailing wages applicable to this Project, as required by Texas Government Code Section 2258.023(b).

§ 3.4.3 ~~The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.~~**Substitutions**

§ 3.4.3.1 If the Contract Documents (including the Instructions to Proposers and /or Offerors) specifically permit the submission by Contractor of requests for substitutions, Contractor may, within thirty (30) days after the Contract has been executed, make written request for the substitution of products in place of those specified in the Contract Documents to the Owner and the Architect. Any request for substitution shall be submitted to the Architect in writing, with appropriate shop drawings, product data, and certified test results substantiating the proposed product equivalence as required by this Section 3.4.3.1 and Section 3.4.3.2 and will be rejected if not so submitted.

§ 3.4.3.2 The Contractor must submit to the Architect and the Owner (i) a full explanation of the proposed substitution and submittal of all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other information necessary for a complete evaluation of the substitution; (ii) a written explanation of the reasons the substitution is necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable; (iii) the adjustment, if any, in the Contract Sum; (iv) the adjustment, if any, in the time of completion of the Contract and any modifications to the construction schedule; and (v) an affidavit stating that (a) the proposed substitution confirms to and meets all the requirements of the pertinent Specifications and the requirements shown on the Drawings, (b) the Contractor accepts the warranty and correction obligations in connection with the proposed substitution as if originally specified by the Architect; (c) the cost breakdown presented with Contractor's request is complete and includes all related costs, except for the Architect's redesign costs, if any, and waives all claims for additional costs related to the substitution which subsequently become apparent;(d) that the Contractor will coordinate and supervise the installation of the proposed substitute, making such changes as may be required for the Work to be complete in all respects; and (e) the Contractor will reimburse the Owner and for review or redesign services associated with any re-approval by applicable governmental authorities related to the substitution.

§ 3.4.3.3 By making requests for substitutions pursuant to Section 3.4.3 (and all subsections), the Contractor represents and certifies that: (1) Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to the product specified; (2) Contractor will provide the same warranty for the substitution product that the Contractor would have provided for the product specified; (3) the cost breakdown presented with the request is complete and includes all related costs, except for the Architect's redesign costs, if any, and waives all claims for additional costs related to the substitution which subsequently become apparent; (4)

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Contractor will coordinate and supervise the installation of the proposed substitute, making such changes as may be required for the Work to be complete in all respects; and (5) will reimburse Owner and Architect for review or redesign services associated with any re-approval by applicable governmental authorities related to the substitution.

§ 3.4.3.4 Owner and the Architect may accept or reject any such request for substitution in their sole discretion, based on cost, time, or other considerations. Requests for substitutions submitted after such thirty (30) day period will not be considered unless a product becomes impossible to obtain due to circumstances beyond the Contractor's control.

§ 3.4.3.5 Regardless of acceptance or rejection of substitution, the Contractor shall be responsible for amounts paid by the Owner to the Architect, to evaluate the Contractor's proposed substitutions and any amounts paid to the Architect to make agreed upon changes in the Specifications and Drawings made necessary by the Owner's acceptance of such substitutions. The Owner shall be entitled to deduct such amounts from the Contract Sum.

§ 3.4.4 Responsibility for Subcontractors

§ 3.4.4.1 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. Contractor, its subcontractors and vendors shall bear responsibility for compliance with all federal, state and local laws, regulations, guidelines, and ordinances pertaining to worker safety and applicable to the Work. Contractor further recognizes that the Owner and Architect do not owe the Contractor any duty to supervise or direct his work so as to protect the Contractor from the consequences of his own conduct. THE CONTRACTOR RELEASES, INDEMNIFIES AND HOLDS HARMLESS THE OWNER FOR CONTRACTOR'S FORCES; NON-COMPLIANCE WITH OWNER'S DRUG-FREE, ALCOHOL-FREE, WEAPON-FREE, HARASSMENT-FREE, AND TOBACCO-FREE ZONES; CONTRACTOR'S FORCES NON-COMPLIANCE WITH CRIMINAL LAW; OR CONTRACTOR'S OR CONTRACTOR'S FORCES NON-COMPLIANCE WITH IMMIGRATION LAW OR REGULATIONS. Any individual found by Owner to have violated these restrictions is subject to permanent removal from the Project, at Owner's request. Contractor shall place similar language in its subcontract agreements, requiring its Subcontractors and Sub-subcontractors to be responsible for their own forces and Contractor shall cooperate with the Owner to ensure Subcontractor and Sub-subcontractor compliance.

§ 3.4.4.2 The Contractor shall only employ or use labor in connection with the Work capable of working harmoniously with all trades, crafts, and any other individuals associated with the Project. The Contractor shall be responsible for the actions of Contractor's forces, Subcontractor's forces and all tiers of Sub-subcontractor's forces. The Contractor recognizes that the Work may be performed in connection with an operational educational facility or the Project site may be adjacent to a public-school campus. It is imperative that Contractor's operations and the performance of the Work not interfere with, interrupt, disturb or disrupt Owner's normal operations or facilities. Contractor shall exercise the utmost skill and judgment to ensure that continuing construction activity will not interfere with the use, occupancy and quiet enjoyment of facilities in use on the site. Contractor recognizes that the ongoing activities in proximity with its construction activities shall result in the need for prompt and effective coordination of its services with those involved in the ongoing utilization of the premises. Such coordination and adequate site access shall be the responsibility of Contractor. Contractor understands and accepts the difficulties and costs associated with working at or near an operational campus and the potential delays and disruptions in its Work and has included such items in the Contract Time and the Contract Sum.

§ 3.4.5 Criminal History Records Checks

§ 3.4.5.1 Prior to the commencement of work, Contractor shall take all necessary steps to comply with Texas Education Code, Section 22.0834 by obtaining, if a Qualified Contractor, as defined, or arranging with Owner to obtain, if not a Qualified Contractor, national criminal history record information ("CHRI") as to Contractor and Subcontractors and all persons associated with them including their employees, agents and representatives who a) have or will have continuing duties related to the contracted services; and b) have or will have direct contact with students (each a "Covered Employee").

§ 3.4.5.2 If the Contractor or any Subcontractor determines that § 3.4.5.1 does not apply to an employee, the Contractor or Subcontractor shall make a reasonable effort to ensure that the conditions or precautions that resulted in the determination that § 3.4.5.1 did not apply to the employee continue to exist throughout the time that the contracted services are provided.

§ 3.4.5.3 The requirements of § 3.4.5.1 do not apply if:

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.1 the public work does not involve the construction, alteration, or repair of an Instructional Facility as defined by Section 46.001, Texas Education Code (real property, an improvement to real property, or a necessary fixture of an improvement to real property that is used predominantly for teaching the curriculum required by the Texas Education Code);

.2. for public work that involves construction of a new Instructional Facility, the person's duties related to the contracted services will be completed not later than the seventh (7th) day before the first day the facility will be used for instructional purposes; or

.3 for a public work that involves an existing Instructional Facility:

(a) the public work area contains sanitary facilities and is separated from all areas used by students by a secure barrier fence that is not less than six feet in height; and

(b) the Contractor adopts a policy prohibiting employees, including subcontractor entity employees, from interacting with students or entering areas used by students, informs employees of the policy, and enforces the policy at the public work area.

§ 3.4.5.4 If the Contractor is not a Qualified School Contractor, a person to whom § 3.4.5.1 applies must submit to a CHRI review by the Owner.

§ 3.4.5.5 Owner and Contractor agree to destroy any CHRI obtained or indexed by the Federal Bureau of Investigation ("FBI") or Texas Department of Public Safety ("DPS") under this § 3.4.5 after the information is used for its authorized purpose. CHRI may only be released to the individual who is the subject of the information, by court order, or as allowed by law.

§ 3.4.5.6 Any Covered Employee that has during the preceding thirty (30) years, (a) been convicted of or placed on deferred adjudication community supervision for an offense for which a defendant is required to register as a sex offender under Chapter 62, Code of Criminal Procedure; or (b) been convicted of a felony offense under Title 5, Texas Penal Code if the victim of the offense was under 18 years of age at the time the offense was committed; (c) been convicted of an equivalent offense to (a) or (b) under federal law or the laws of another state ("Disqualifying Criminal History"); shall be disqualified and prohibited from performing any contract duties or services and neither the Contractor nor its Subcontractor may permit such person to provide services at an Instructional Facility. If a Covered Employee is determined by the Owner's review of the CHRI to have a Disqualifying Criminal History, Contractor will exclude that person from assignment to the Project. To the extent the Owner, not the Contractor obtains the CHRI described in this § 3.4.5, Contractor understands that it will not have access to the results of such criminal history records check, based on statewide regulations beyond the control of the Owner, and agrees to rely solely on the judgment of the Owner as to whether the Covered Employee must be excluded from the Project.

§ 3.4.5.7 Prior to commencement of its work on the Project the Contractor will provide written certification to the Owner that either: (1) Contractor and its Subcontractors of every tier, do not have any Covered Employees, as defined; (2) Contractor and its Subcontractors of every tier are otherwise exempt from compliance with the requirements contained herein; or (3) Contractor and its Subcontractors of every tier have complied with the statutory and contractual requirements of this Agreement as of that date.

§ 3.4.5.8 Contractor agrees that if it receives information that a Covered Employee is arrested or convicted for any of the Disqualifying Criminal History offenses, during the performance of the Work, Contractor will immediately remove the Covered Employee from Owner's property or other location where students are regularly present, and notify the Owner of said removal within three (3) days of doing so. Contractor understands that any failure to comply with the requirements of this section may be grounds for termination of this Agreement by Owner, in accordance with Article 14, Termination.

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§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. The Contractor further warrants that Contractor shall perform the Work in a good and workmanlike manner, continuously and diligently in accordance with all applicable codes, generally accepted standards of construction practice for construction of projects similar to the Project. All materials shall be installed in a true and straight alignment, level and plumb; patterns shall

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be uniform; and jointing of materials shall be flush and level, unless otherwise directed in writing by the Architect. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. No acceptance or payment by the Owner shall constitute a waiver of the foregoing and nothing herein shall exclude or limit any warranties implied by law. The warranties provided in this Section 3.5.1 are in addition to, and not in limitation of, any other warranties, remedies and/or guaranties set out in the Contract Documents or under applicable law. Furthermore, the Contractor's warranty period shall be for one (1) year from the date of Final Completion with exception to other extended warranties that may be applicable to the Project identified within the Project requirements.

§ 3.5.3 Contractor acknowledges that the Project may involve construction work on more than one (1) building for the Owner. In such case, each building, or approved phase of each building, may have its own, separate, and independent date of Substantial Completion (or, for Work to be completed or corrected after the date of Substantial Completion, the Warranty Commencement Date). Contractor shall maintain a complete and accurate schedule of the date(s) of Substantial Completion, the date(s) of Final Completion, and the dates upon which the warranties under granted in the Contract Documents will expire, on each phase or building and will provide a copy of such Schedule to the Owner, as required in Subsection 3.5.6, as a condition precedent to Final Payment.

§ 3.5.4 When deemed necessary by the Owner and prior to installation of any item specifically made subject to a performance standard or regulatory agency standard under any provision of the Contract Documents, Contractor shall furnish proof of conformance to the Architect. Proof of conformance shall be in the form of an affidavit from the manufacturer certifying that the item is in conformance with the applicable standards; an affidavit from a testing laboratory certifying that the product has been tested within the past year and is in conformance with the applicable standards; or such further reasonable proof as is required by the Architect.

§ 3.5.5 The Contractor agrees to assign to the Owner at the time of Final Completion of the Work any and all manufacturer's warranties relating to equipment, machinery, materials, equipment or components and labor incorporated into the Work and further agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties. Contractor shall take no action or fail to act in any way which results in the termination or expiration of such third-party warranties or which otherwise results in prejudice to the rights of Owner under such warranties. Contractor agrees to provide all notices required for the effectiveness of such warranties and shall include provisions in the contracts with the providers and manufacturers of such systems and equipment whereby Owner shall have a direct right, but not a duty, of enforcement of such warranty obligations. The warranties provided in this Section 3.5 or otherwise provided in the Contract Documents or by law, shall in no way limit or abridge the warranties provided by the suppliers of equipment and systems which are to comprise a portion of the Work. A complete set of all warranties required from contractors, manufacturers, or suppliers as appropriate, on the manufacturer's or supplier's approved forms, executed by Contractor as required, with a Warranty Commencement Date noted as required, and in the form required by Subparagraph 3.5.6 shall be submitted to the Architect for delivery to the Owner, as a condition precedent to Final Payment.

§ 3.5.6 Prior to receipt of Final Payment, Contractor shall: (1) obtain duplicate original warranties, executed by all subcontractors, and the warranties of suppliers and manufacturers, noting the Warranty Commencement Date on the face of each; (2) verify that the documents are in proper form and contain full information; (3) Co-sign warranties when required; (4) bind all warranties in commercial quality 8-1/2 X 11 inch three-ring binder, with hardback, cleanable, plastic covers; (5) label the cover of each binder with a typed or printed title labeled "WARRANTIES", along with the Title of the Project; name, address and telephone number of Contractor; and name of its responsible principal; (6) include a Table of Contents, with each item identified by the number and title of the specification section under which the product is specified; (7) include the Schedule of Warranty Commencement Dates required by Subparagraph 3.5.3; (8) separate each warranty with index tab sheets keyed to the Table of Contents listing; and (8) deliver warranties in the form described in this Subparagraph 3.5.6, to the Architect for review same prior to submission to the Owner.

The Contractor shall ~~pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to~~

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~~go into effect.~~not include in the Contract Price or any Modification any amount for sales, use, or similar taxes for which (1) a Texas independent school district is exempt, and (2) the Owner has provided the Contractor with a tax exemption certificate or other documentation necessary to establish the Owner's exemption from such taxes. **CONTRACTOR HEREBY RELEASES, INDEMNIFIES, AND HOLDS HARMLESS OWNER FROM ANY AND ALL CLAIMS AND DEMANDS MADE AS A RESULT OF THE FAILURE OF CONTRACTOR OR ANY SUBCONTRACTOR TO COMPLY WITH THE PROVISIONS OF ANY OR ALL SUCH LAWS AND REGULATIONS.**
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§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time ~~bids are received or negotiations concluded.~~proposals are received or negotiations concluded. The Owner shall be responsible for payment of TDLR Texas Accessibility submissions and inspection costs.

§ 3.7.2 ~~The~~ In performing its obligations hereunder, the Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the ~~Work.~~Work and upon request by the Owner or Architect shall furnish evidence, satisfactory to the Owner, of such compliance.

§ 3.7.3 If the Contractor performs Work ~~knowing~~ when Contractor knows or reasonably should have known it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, the Contract Documents, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction. **THE CONTRACTOR AGREES TO INDEMNIFY, DEFEND AND HOLD HARMLESS THE OWNER, ITS TRUSTEES, OFFICERS, REPRESENTATIVES, AGENTS AND EMPLOYEES FROM AND AGAINST ALL THIRD-PARTY CLAIMS, FINES, PENALTIES, OR LIABILITIES FROM, ARISING OUT OF, OR BASED UPON CONTRACTOR'S VIOLATION OF ANY LAWS, ORDINANCES, RULES, REGULATIONS, ORDERS OR DECREES.**

~~**§ 3.7.4 Concealed or Unknown Conditions**~~
~~If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.~~

§ 3.7.4 Claims for Concealed or Unknown Conditions
Contractor acknowledges that there may exist at the Project site certain soil and geological conditions and/or surface physical conditions which are not disclosed in the Contract Documents, and which have been known to or may be reasonably anticipated to occur in the area or be related to any past use of the Project site, including, without limitation, the presence of rock and its hardness, geologic formations, differing soils, and surface structures, equipment or other impediments, either natural or man-made (collectively, "Subsurface Conditions"). Owner makes no representations or warranties regarding Subsurface Conditions at the Project site, or of the accuracy or continuity of conditions which may be noted in any reports furnished or made available to Contractor. Contractor covenants and agrees that any such reports are furnished or made available by Owner to Contractor for information purposes only, and Contractor acknowledges that Owner is not responsible for the content thereof. Contractor shall be responsible for inspecting the site and determining the existence or likelihood of any Subsurface Conditions which may affect the Contract Time or the Contract Sum, or both. The Contract Time and the Contract Sum contained herein (as proposed by Contractor), or GMP as applicable, shall be deemed to include all costs of and sufficient time to complete all Work associated with or attributable to Subsurface Conditions, and Contractor shall not be entitled to submit a claim for or to obtain an extension of the Contract Time or increase in the Contract Sum due to the existence of Subsurface Conditions. Except as provided above with respect to Subsurface Conditions, if the Contractor encounters conditions

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at the site that are subsurface or otherwise concealed physical conditions which were not known to the Contractor, and that differ materially from those indicated in the Contract Documents the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed, and in no event later than three (3) days after first observance of the conditions and report its findings to the Owner and Architect.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract ~~Sum and Contract~~ Time arising from the existence of such remains or features may be made as provided in Article 15. In accordance with the terms of this Agreement, there will be no adjustment to the Contract Sum for delay arising out or related to the circumstances described in this Section 3.7.5.

§ 3.7.6 The Contractor shall also obtain all permits and approvals, and pay all fees and expenses, if any, associated with National Pollutant Discharge Elimination System (NPDES) regulations administered by the Environmental Protection Agency (EPA) and local authorities, if applicable, that require completion of documentation and/or acquisition of a "Land Disturbing Activities Permit" for the Project. Contractor's obligations under this Section do not require it to perform engineering services during the pre-construction phase to prepare proper drainage for the construction sites. However, any drainage alterations made by Contractor during the construction process which require the issuance of a permit shall be at Contractor's sole cost.

§ 3.7.7 The Contractor shall certify in writing that no materials used in the Work contain lead or asbestos materials in them in excess of amounts allowed by Local/State standards, laws, codes, rules and regulations; the Federal Environmental Protection Agency (EPA) standards and/or the Federal Occupational Safety and Health Administration (OSHA) standards, whichever is most restrictive. The Contractor shall provide this written certification as part of submittals under the Section in the Instruments of Service related to Contract Closeout.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner ~~with reasonable promptness.~~within such time as is reasonably specified by the Contractor as necessary to avoid delay in the Work.

§ 3.8.4 When performing Work under Allowances, where reasonably possible, Contractor shall solicit and receive no fewer than three (3) written proposals and shall provide the Work on the basis of the best value for the Owner, as directed by the Architect following Owner's written approval of the cost proposal.

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§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. The Contractor shall not replace the Superintendent prior to Final Completion of the Work unless (1) the Superintendent shall cease to be employed by the Contractor or its subsidiaries or affiliated companies, or (2) the Owner agrees to such replacement. The Superintendent may not be employed on any other project prior to Final Completion of the Work. From Substantial Completion to Final Completion, the Superintendent shall be on-site as necessary to ensure that Final Completion occurs within thirty (30) days of Substantial Completion.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall ~~notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.~~furnish a list to the Architect a list of all engineers, consultants, job-site superintendents, subcontractors and suppliers involved in construction. The Architect shall provide such information to the Owner. The Owner shall have the right, at any time, to require a change in any engineer, consultant, job-site superintendent, subcontractor or supplier if their performance is deemed unsatisfactory in its sole discretion.

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§ 3.9.3 The Contractor shall ~~not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.~~provide an adequate staff for the proper coordination and expedition of the Work. Owner reserves the right to require Contractor to dismiss from the Work any employee or employees that Owner may deem incompetent, careless, insubordinate, or in violation of any provision in these Contract Documents. This provision is applicable to Subcontractors, Sub-subcontractors and their employees.

§ 3.9.4 Owner shall be notified as soon as Contractor becomes aware, but in no event fewer than twenty-four (24) hours before the time of that the Superintendent is required to be present at the site, that the Superintendent will not be present at the site for any reason, except illness. If the reason is due to illness, then Owner shall be notified as soon as the Contractor obtains the information, but in no event later than the beginning of the day that the Superintendent will be absent from the site. In such event of such absence, the Contractor will designate a person as acting superintendent and Contractor promptly notify the Owner of the identity and contact information for the designated acting superintendent.

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§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the ~~Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.~~Work, utilizing critical path method scheduling techniques. The Schedule shall not exceed the time limits set forth in the Contract Documents. The Schedule shall thereafter be updated on a monthly basis and submitted with each Application For Payment. The receipt of an updated schedule with each Application For Payment shall be a condition precedent to the Owner's duty to make any payment pursuant to Article 9.6. The schedule shall not interfere with the operation of Owner's existing facilities and operations without Owner's prior written approval.

§ 3.10.1.1 Each Schedule shall: (1) break the work into a sufficient number of activities to facilitate the efficient use of critical path method scheduling by the Contractor, Owner, and Architect and shall assign each scheduled activity a cost value consistent with the Schedule of Values so as to allow the Owner and Contractor to project cash flow for the Project; (2) include activates representing manufacturing, fabrication, or ordering lead time for materials, equipment or other items for which the Architect is required to review submittals, shop drawings, product data, or samples; (3) with the exception of the initial schedule, shall indicate the activities, or portions thereof, which have been completed; (4) shall reflect the actual time for completion of such activities, and shall reflect any changes to the sequence or planned duration of all activities.

§ 3.10.1.2 If any updated Schedule exceeds the time limits set forth in the Contract Documents for completion of the Work, the Contractor shall include with the updated Schedule, a statement of the reasons for the anticipated delay in completion of the Work and the Contractor's planned course of action for completing the Work within the time limits set forth in the Contract Documents. If the Contractor asserts that the failure of the Owner or the Architect to provide information to the Contractor is the reason for anticipated delay in completion, the Contractor shall also specify what information is required from the Owner or Architect and documentation of the date such information was requested.

§ 3.10.1.3 Neither the Owner or the Contractor shall have exclusive ownership of float time in the schedule, and all float time shall inure to the benefit of the Project. The Contractor agrees to use its best efforts not to sequence the Work or assign activity durations so as to produce a schedule in which more than one-fourth of the remaining activities have no float time.

§ 3.10.1.4 Upon review and acceptance by the Owner and the Architect of the Milestone Dates, the construction schedule shall be deemed part of the Contract Documents. If not accepted, the construction schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted for acceptance. Submission of any schedule under this Contract constitutes a representation by the Contractor that: (1) the schedule represents the sequence in which the Contractor intends to prosecute the remaining Work; (2) the schedule represents the actual sequence and durations used to prosecute the completed Work; (3) that to the best of its

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knowledge and belief the Contractor is able to complete the remaining Work in the sequence and time indicated; and, (4) that the Contractor intends to complete the remaining Work in the sequence and time indicated.

§ 3.10.1.5 The Contractor shall recommend to the Owner and to the Architect a schedule for procurement of long-lead time items which will constitute part of the Work as required to meet the Project schedule. If such long-lead time items are procured by the Owner, they shall be procured on terms and conditions as recommended by the Contractor. Upon the Owner's acceptance of the Contractor's Stipulated Sum proposal or Guaranteed Maximum Price, as applicable, all contracts previously entered into by Owner shall be assigned by Owner to the Contractor who shall accept responsibility for such contracts as if it had initially entered into such contracts. Contractor shall expedite the delivery of long-lead time items. The Contractor shall receive and protect all Owner supplied material.

§ 3.10.1.6 The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The accepted construction schedule shall be updated to reflect actual conditions.

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§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and ~~Architect.~~Architect and shall attend progress meetings at the Project Site, in such frequency as are acceptable to the Owner. Progress of the work shall be reported at said meetings with reference to Contractor's construction schedule.

§ 3.10.4 The Contractor shall submit to the Architect with each monthly application for payment a copy of the progress schedule showing all modifications required, and shall take whatever corrective action is necessary to assure that the project completion schedule is met at no additional cost to Owner, except as allowed herein.

§ 3.10.4 Correction of Delay.

§ 3.10.4.1 In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary. In no event shall any progress report constitute an adjustment in the Contract Time, or any Milestone Date unless any such adjustment is submitted by the Contractor as a Claim in compliance with Article 15 or the adjustment is otherwise agreed to in a written confirmation from the Owner and documented by written Change Order.

§ 3.10.4.2 If at any time the Owner determines that the performance of the Work has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction, including, without limitations, (i) working additional shifts of overtime, (ii) supplying additional manpower, equipment and facilities, and (iii) other similar measures (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the construction schedule. The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Owner under or pursuant to this Subparagraph 3.10.4. The Owner may exercise the rights furnished the Owner under or pursuant to this Subparagraph 3.10.4 as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with any Milestone Date or completion date set forth in the Contract Documents.

§ 3.10.4.3 In the event Contractor determines that the Scheduled Completion Date cannot be met by resequencing the Work, then Contractor shall immediately provide to the Owner, and in any event within seven (7) days after the date of receipt of any request by Owner for resequencing or acceleration, a plan to complete the Work in the shortest possible time. No approval by the Owner of any plan for resequencing or acceleration of the Work submitted by Contractor pursuant to this paragraph shall constitute a waiver by Owner of any damages or losses which Owner may suffer by reason of such resequencing or the failure of Contractor to meet the Scheduled Completion Date.

...

The Contractor shall maintain and make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, field test records (including environmental inspection and test records), inspection certificates or records, manufacturers' certificates. The Documents to be

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maintained shall be kept in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and ~~Owner,~~ Owner or their respective representatives, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

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§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the ~~information given and the design concept expressed in the~~ Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

...

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. Specific dimensions, quantities, installation and performance of equipment and systems in compliance with the Construction Documents and the Contract Documents remain the Contractor's responsibility.

...

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the ~~Architect~~ Architect, in writing, of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

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§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall ~~be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall~~ cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Contractor represents and warrants that all shop drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the shop drawings are prepared and, if required by the Architect or applicable law, by a licensed engineer The Owner and the Architect shall be entitled to rely upon the ~~adequacy~~ adequacy, completeness and accuracy of the services, certifications, and approvals performed or provided by such design ~~professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10,~~ professionals. Pursuant to this Section 3.12.10.1, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. A registered architect must prepare plans and specifications for all the Work, as governed by the Texas Occupations Code Chapter 1051; and a registered engineer must prepare plans, specifications and estimates for all Work governed by Texas Occupations Code Chapter 1001. In the event that Contractor retains a licensed design

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professional under the terms of this paragraph, Contractor shall require that the licensed design professional carry commercial general liability and errors and omissions insurance coverage in the same amounts and forms as required of the Architect on this Project. In the event that the licensed design professional retained by the Contractor will be conducting on-site services or observations, the licensed design professional shall also carry worker's compensation insurance and comprehensive automobile liability in the same amounts and forms as required of the Architect on this Project.

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§ 3.12.10.3 The Architect's review of Contractor's submittals will be limited to one examination of an initial submittal and one (1) examination of a resubmittal. The Architect's review of additional submittals will be made only with the consent of the Owner after notification by the Architect. The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for evaluation of such additional resubmittals.

~~The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.~~§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. The Contractor shall so conduct its operations as not to unreasonably interfere with traffic on public thoroughfares adjacent or near to the Project site.

§ 3.13.2 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. Protection of construction material and equipment stored at the Project site from weather, theft, damage and all other adversity is solely the responsibility of the Contractor.

§ 3.13.3 Without prior approval of the Owner, the Contractor shall not permit any workers to use any of Owner's existing facilities at or adjacent to the Project site, including, without limitation, lavatories, toilets, entrance and parking areas other than those designated by the Owner. The Contractor shall comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and Owner's Buildings.

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§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together ~~properly.~~ properly, provided, however, that any such cutting, fitting or patching can only be performed if the cutting, fitting or patching results in Work that is in accordance with the Contract Documents. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

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§ 3.15.1 The Contractor ~~shall~~ shall, on a daily basis, keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. Contractor shall provide on-site containers for the collection of waste materials, debris and rubbish, and shall periodically remove waste materials, debris and rubbish from the Work and dispose of all such materials at legal disposal areas away from the site. All cleaning operations shall be scheduled so as to ensure that contaminants resulting from the cleaning process will not fall on newly-coated or newly-painted surfaces. Immediately after unpacking materials, all packing case lumber or other packing materials, wrapping or other like flammable waste shall be collected and removed from the building and premises. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project. Prior to the Architect's inspection for Substantial Completion, the Contractor shall clean exterior and interior surfaces exposed to view; remove temporary labels, stains, putty, soil, paint and foreign substances from all surfaces, including glass and painted surfaces; polish transparent and glossy surfaces; clean equipment and fixtures to a sanitary condition; replace air filters in mechanical equipment; clean roofs, gutters, and downspouts; remove obstructions and flush debris from drainage systems; clean site; sweep paved areas and rake clean other surfaces; remove trash and surplus materials from the site; clean and polish all floors; clean and polish all hardware; and repair all Work damaged during cleaning and replace any damaged or broken glass.

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§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor. Such reimbursement amounts may be deducted from Contractor's Final Payment Application.

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The Contractor shall provide the ~~Owner and Architect~~ Owner, Architect and their designated representatives, with access to the Work in preparation and progress wherever located. The presence of the Owner, Architect or their representatives does not constitute acceptance or approval of the Work. Upon request of the Architect or Owner, the Contractor shall accompany the Architect or Owner on an inspection of the Work.

...

~~The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.~~THE CONTRACTOR SHALL PAY ALL ROYALTIES AND LICENSE FEES. TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE OWNER, THE OWNER'S TRUSTEES, OFFICERS, AGENTS AND EMPLOYEES DEFEND AGAINST ANY AND ALL SUITS, CLAIMS, LAWSUITS, JUDGMENTS, COSTS, LIENS, LOSSES, EXPENSES, FEES (INCLUDING REASONABLE ATTORNEY'S FEES, AS PERMITTED BY STATUTE), PROCEEDINGS, ACTIONS, DEMANDS, CAUSES OF ACTION, LIABILITY FOR INFRINGEMENT OF COPYRIGHTS AND PATENT RIGHTS ALLEGED TO HAVE RESULTED FROM CONTRACTOR'S INFRINGEMENT, AND SHALL INDEMNIFY AND HOLD THE OWNER THE OWNER'S TRUSTEES, OFFICERS, AGENTS AND EMPLOYEES HARMLESS FROM LOSS ON ACCOUNT THEREOF, INCLUDING ATTORNEY'S FEES (AS PERMITTED BY STATUTE), BUT SHALL NOT BE RESPONSIBLE FOR DEFENSE OR LOSS WHEN A PARTICULAR DESIGN, PROCESS, OR PRODUCT OF A PARTICULAR MANUFACTURER OR MANUFACTURERS IS REQUIRED BY THE CONTRACT DOCUMENTS, OR WHERE THE COPYRIGHT VIOLATIONS ARE CONTAINED IN DRAWINGS, SPECIFICATIONS, OR OTHER DOCUMENTS PROVIDED BY THE OWNER OR PREPARED BY THE ARCHITECT. HOWEVER, IF AN INFRINGEMENT OF A COPYRIGHT OR PATENT ATTRIBUTABLE TO THE OWNER OR ARCHITECT, IS DISCOVERED BY, OR MADE KNOWN TO, THE CONTRACTOR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOSS UNLESS THE INFORMATION IS PROMPTLY FURNISHED TO THE OWNER AND THE ARCHITECT.

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§ 3.18.1 ~~To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.~~TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL INDEMNIFY, DEFEND (EXCEPT AS LIMITED BELOW) AND HOLD HARMLESS THE OWNER, THE OWNER'S TRUSTEES, OFFICERS, AGENTS AND EMPLOYEES (HEREINAFTER IN THIS SECTION 3.18 "OWNER"), FROM AND AGAINST ALL CLAIMS, DAMAGES, LOSSES, AND EXPENSES, (INCLUDING BUT NOT LIMITED TO REASONABLE ATTORNEY'S FEES, AS PERMITTED BY STATUTE), ARISING OUT OF OR RESULTING FROM PERFORMANCE OF THE WORK, PROVIDED THAT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE OR DEATH, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY (OTHER THAN THE WORK ITSELF), INCLUDING THE LOSS

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§ 3.18.2 ~~In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.~~IN CLAIMS AGAINST ANY PERSON OR ENTITY INDEMNIFIED UNDER THIS SECTION 3.18 BY AN EMPLOYEE OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THEM, OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, THE INDEMNIFICATION OBLIGATION UNDER SECTION 3.18.1 SHALL NOT BE LIMITED BY A LIMITATION ON AMOUNT OR TYPE OF DAMAGES, COMPENSATION, OR BENEFITS PAYABLE BY OR FOR THE CONTRACTOR OR A SUBCONTRACTOR UNDER INSURANCE POLICIES, WORKERS' COMPENSATION ACTS, DISABILITY BENEFIT ACTS, OR OTHER EMPLOYEE BENEFIT ACTS.

§ 3.18.3 THE DUTY TO DEFEND SET OUT ABOVE SHALL NOT APPLY IN THE EVENT THAT THE CLAIM IS BASED, IN WHOLE OR IN PART, ON THE NEGLIGENCE OF, FAULT OF, OR BREACH OF CONTRACT BY THE OWNER. NOTWITHSTANDING THE FOREGOING, THE CONTRACTOR AGREES TO REIMBURSE THE OWNER'S REASONABLE ATTORNEY'S FEES IN PROPORTION TO THE CONTRACTOR'S LIABILITY.

§ 3.18.4 CONTRACTOR SHALL BE RESPONSIBLE FOR AND SHALL HOLD OWNER FREE AND HARMLESS FROM LIABILITY RESULTING FROM LOSS OF OR DAMAGE TO CONTRACTOR'S OR ITS SUBCONTRACTORS' CONSTRUCTION TOOLS AND EQUIPMENT AND RENTED ITEMS WHICH ARE USED OR INTENDED FOR USE IN PERFORMING THE WORK, REGARDLESS OF WHETHER SUCH LOSS OR DAMAGE IS CAUSED IN WHOLE OR IN PART BY THE WILLFUL, INTENTIONAL OR NEGLIGENT ACTS OR OMISSIONS OF THE CONTRACTOR, A SUBCONTRACTOR, ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY THE CONTRACTOR, OR ANYONE FOR WHOSE ACTS THEY MAY BE LIABLE, REGARDLESS OF WHETHER OR NOT SUCH CLAIM, DAMAGE, LOSS, OR EXPENSE IS CAUSED IN PART BY THE OWNER. IF THE OWNER'S NEGLIGENCE IS A CONCURRENT CAUSE OF THE INJURY, DEATH, OR DAMAGE, CONTRACTOR'S OBLIGATION TO INDEMNIFY IS LIMITED TO THE AMOUNT NECESSARY TO CAUSE THE RELATIVE LIABILITY OF OWNER AND CONTRACTOR TO REFLECT THE COMPARATIVE NEGLIGENCE FINDINGS OF THE TRIER OF FACT (JUDGE OR JURY) OR AS AGREED IN A SETTLEMENT AGREEMENT TO WHICH OWNER AND CONTRACTOR ARE BOTH PARTIES. THIS PROVISION SHALL APPLY, WITHOUT LIMITATION, TO LOSS OR DAMAGE OCCURRING AT THE WORK SITE OR WHILE SUCH ITEMS ARE IN TRANSIT TO OR FROM THE WORK SITE AND IS IN ADDITION TO CONTRACTOR'S OBLIGATIONS UNDER SECTION 3.18.1.

§ 3.18.5 The indemnification hereunder shall include, without limiting the generality of the foregoing, liability which could arise to the Owner pursuant to State statutes for the safety of workmen and in addition, all Federal statutes and rules existing thereunder for protection, occupational safety and health to workmen. It being agreed that the primary obligation of the Contractor is to comply with said statutes in performance of the Work by Contractor and that the obligations of the Owner under said statutes are secondary to that of the Contractor.

§ 3.18.6 It is agreed with respect to any legal limitations now or hereafter in effect and affecting the validity or enforceability of the indemnification obligations under Section 3.18, such legal limitations are made a part of

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the indemnification obligation and shall operate to amend the indemnification obligation to the minimum extent necessary to bring the provision into conformity with the requirements of such limitations, and as so modified, the indemnification obligations shall continue in full force and effect.

§ 3.18.7 Contractor shall promptly advise the Owner, in writing, of any claim or demand against the Owner or Contractor, known to the Contractor related to or arising out of Contractor's activities under this Contract.

§ 3.18.8 The provisions in Section 3.18 in its entirety shall survive the completion, termination or expiration of this contract and are solely for the benefit of the parties hereto and not intended to create or grant any rights, contractual or otherwise, to any other person or entity.

§ 3.19 Representations And Warranties

§ 3.19.1 The Contractor represents and warrants the following to the Owner (in addition to the other representations and warranties contained in the Contract Documents), as an inducement to the Owner to execute this Contract, which representations and warranties shall survive the execution and delivery of the Contract and the Final Completion of the Work:

.1 that it is financially solvent, able to pay its debts as they mature and possessed of sufficient working capital to complete the Work and perform its obligations under the Contract Documents;

.2 that it is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder and has sufficient experience and competence to do so;

.3 that it is authorized to do business in the State where the Project is located and properly licensed by all necessary governmental and public quasi-public authorities having jurisdiction over it and over the Work and the site of the Project;

.4 that the execution of the Contract and its performance thereof is within its duly authorized powers; and

.5 that its duly authorized representative has visited the site of the Work, familiarized itself with the local conditions under which the Work is to be performed and correlated its observations with the requirements of the Contract Documents.

§ 3.20 Business Standards

§ 3.20.1 Contractor, in performing its obligations under Contract, shall establish and maintain appropriate business standards, procedures, and controls, including those necessary to avoid any real or apparent impropriety or adverse impact on the interest of Owner or affiliates. Contractor shall review, with Owner, at a reasonable frequency during the performance of the Work hereunder, such business standards and procedures including, without limitation, those related to the activities of Contractor's employees and agents in their relations with Owner's employees, agents, and representatives, vendors, Subcontractors, and other third parties, and those relating to the placement and administration of purchase orders and contracts.

§ 3.21 Antitrust Violation

To permit the Owner to recover damages suffered in antitrust violations, Contractor hereby assigns to Owner any and all claims for overcharges associated with this Contract which violate the antitrust laws of the United States, 15 U.S.C.A. Section 1 et seq. The Contractor shall include this provision in its agreements with each subcontractor and supplier. Each subcontractor shall include such provisions in agreements with sub-subcontractors and suppliers.

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§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, ~~Contractor, and Architect. Consent shall not be unreasonably withheld.~~

...

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date ~~the Architect issues the final Certificate for Payment.~~ of the Owner's contract with the Architect terminates. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract ~~Documents.~~Documents, or as they may be amended in the future.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to

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determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract ~~Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.~~Documents, and delivered on time. In addition, the Architect or its structural consultant will (1) provide on-site observations prior to and during all concrete pours that contribute to the structural integrity of the building, including all pours of concrete piers, footings, grade beams, floor slabs, and concrete superstructure components, if applicable; and (2) provide on-site observations prior to covering up or closing up of portions of the construction which, if covered, would conceal problems with the structural integrity of the Project. Contractor shall not close or cover said Work until said observations have occurred. Contractor or Architect will advise Owner of the need for any third-party laboratory or testing services to assist the Architect and Owner.

§ 4.2.3 On the basis of the site ~~**visits,**~~ observations, the Architect will keep the Owner ~~**reasonably**~~ informed about the progress and quality of the ~~**portion of the Work completed, and**~~ Work. The Architect shall promptly report to the Owner and Contractor orally regarding: (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. An oral notification of defects and deficiencies observed in the Work shall be followed by a notice in writing to the Owner and Contractor specifying the defect(s), non-conforming Work, deviations from the Contract Documents and corrective actions taken or recommended. The Architect shall not have control over or responsibility for the Contractor's construction means, methods, techniques, sequences, procedures, or safety programs and will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract ~~**Documents. The Architect will not**~~ Documents, nor shall the Architect have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions ~~**of the Work.**~~of the Work. This does not, however, relieve Architect of Architect's responsibilities under this Agreement. Any services by Contractor made necessary by Contractor's construction defect or nonconforming Work shall be performed by the Contractor at no additional cost to Owner. In addition, the Contractor shall reimburse the Owner for compensation paid to the Architect (whether performed by the Architect or its Consultants) or the Owner's Consultants, for additional site visits made necessary by the fault, neglect, the request of the Contractor or made necessary by the Contractor's construction defect or nonconforming Work. Any amount subject to reimbursement under this Section may be required by Owner to be deducted from the next Payment Application submitted by the Contractor and any subsequent Payment Application until paid, and if any amount remains unpaid, the balance shall be paid by the Contractor as a condition to Final Payment.

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~~The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications~~ Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters relating to the Contract and the Project. However, the Owner reserves the right to communicate directly with the Contractor and Subcontractors. Communication by and with the Architect's consultants shall be through the Architect. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. ~~The Contract Documents may specify other communication protocols.~~

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, in accordance with the Contract Documents, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect or the Owner has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect or the Owner considers it necessary or advisable, the Architect or the Owner will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect or the Owner nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Owner to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work. Certain portions of the Work may be tested and/or observed at various

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stages, sometimes off the Project site, between initial observation or review and final positioning of the completed Work. Nothing in any initial or prior approval or test result shall prevent action to require conformance, if at any subsequent time the Work or any portion thereof is found not to conform to the requirements of the Contract Documents. Architect and/or Contractor shall promptly notify, the other party orally and in writing, and Owner of any perceived fault or defect in the design or nonconformance of the Work with the Construction Documents they may respectively discover and each, upon discovery of the defect or nonconformance, shall be responsible for notifying the other party and Owner of those corrective actions they respectively take; provided, however, Contractor shall have no duty to notify Owner of discoveries made or actions taken by Architect.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness ~~while allowing~~ as to cause no delay in the Work or in the activities of the Owner, Contractor or Separate Contractors, and allow sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component. If any submittal does not comply with the requirements of the Contract Documents, the Architect shall require Contractor to come into compliance. The Architect shall promptly report in writing to the Contractor and Owner any errors, inconsistencies and omissions discovered by the Architect in the Shop Drawings, Product Data and Samples, so as to keep from delaying the Work or the activities of the Owner, Contractor or other Contractors.

§ 4.2.8 The Architect will ~~prepare Change Orders and Construction Change Directives, and may order minor changes in the Work~~ prepare, and make written recommendations to Owner regarding all Change Orders (including changes in the Work to be paid from contingency funds) and Construction Change Directives, for the Owner's approval and execution in accordance with the Contract Documents. The Architect's recommendation shall be accompanied by all supporting documentation necessary for the Owner to make an informed decision, including but not limited to an itemized turn-key proposal from the Contractor which includes quantities and unit costs of labor and materials extended and totaled and, if permitted, overhead and profit proposed. Prior to submission of such documentation to the Owner, the Architect shall review such proposals for reasonableness of pricing and compliance with Section 7.1.4 regarding markup. The Architect may order minor changes in the Work not involving an adjustment in Contract Sum or Guaranteed Maximum Price, or an extension of the Contract Time which are consistent with the intent of the Contract Documents. If necessary, the Architect shall prepare, reproduce and distribute Drawings and Specifications to describe Work to be added, deleted or modified, as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect and the Owner's representative will conduct inspections to determine the date or dates of Substantial Completion and the date of final ~~completion;~~ completion. Upon completion of such inspection and agreement by Owner and Architect as to Substantial Completion, the Architect may issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to ~~Section 9.10.~~Section 9.10 for approval by the Owner.
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§ 4.2.11 ~~The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor.~~ Upon written request of the Owner or Contractor, the Architect will issue its interpretation of the requirements of the plans and specifications. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. ~~When making such interpretations~~

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~~and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.~~

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract ~~Documents.~~Documents and not expressly overruled in writing by the Owner.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for ~~information.~~information at no additional expense to the Owner.

§ 4.2.15 The Architect may appoint an employee or other person to assist the Architect during the construction. These representatives will be instructed to assist the Contractor in interpreting the Contract Documents; however, such assistance shall not relieve the Contractor from any responsibility as set forth by the Contract Documents. The fact that the Architect's Representative may have allowed Work not in accordance with the Contract Documents shall not prevent the Architect from insisting that the faulty Work be corrected to conform to the Contract Documents and the Contractor shall correct same.

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§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and ~~Architect~~ Architect, in writing, of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect ~~may~~ shall notify the Contractor in writing, whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection. A notice of no reasonable objection shall in no way relieve the Contractor from full responsibility for performance and completion of the Work and its obligations under the Contract Documents. The Contractor shall be fully responsible for the performance of its subcontractors, including those recommended or approved by the Owner.

...

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. ~~If the proposed but rejected Subcontractor was~~ When the parties agree on a proposed substitute Subcontractor reasonably capable of performing the Work, the ~~Contract Sum and~~ Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in ~~the Contract Sum or~~ Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected ~~if the Owner or Architect makes reasonable objection to such substitution.~~without providing reasonable written notice to the Owner and Architect. If neither the Owner nor Architect submits a reasonable objection to such proposed substitution within ten (10) days following their receipt of written notice the Contractor may proceed with the substitution. If either Owner or Architect submit an objection, the Subcontractor shall proceed in accordance with Section 5.2.3 above.

§ 5.2.5 Each Contractor or subcontractor shall be required to completely familiarize itself with the plans and specifications, to visit the Work site to completely familiarize itself with existing conditions, and to conduct any other appropriate investigations, inspections or inquiries prior to submission of a bid or proposal. No increases in Contract Sum shall be allowed for failure to so inspect or investigate.

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~~By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract~~

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~~Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.~~§ **5.3.1** By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. The terms and conditions of the Contract Documents shall be incorporated by reference into each subcontract agreement, included as provided below. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. Each subcontractor shall provide proof of insurance to Contractor consistent with the Contractor's insurance to Owner and in an amount commensurate with the Work to be performed by the Subcontractor.

§ **5.3.2** Neither the Owner nor the Architect shall be obligated to pay or to insure the payment of any monies to Subcontractors or vendors by the Contractor.

§ **5.3.3** The Contractor shall require any potential Subcontractor to disclose to the Contractor any ownership interest or familial relationship between the Contractor, the Architect or the Owner and the potential Subcontractor prior to entering into a contract. Contractor shall report to Owner all such disclosures and the Owner shall have the right, in its sole discretion, to reject any such affiliated Subcontractor.

...

§ **5.4.1** Each subcontract agreement for ~~a~~ any unperformed portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner ~~for cause pursuant to Section 14.2~~ or abandonment of the Project by the Contractor and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and ~~Contractor; and~~Contractor in writing;

.2 assignment is subject to the prior rights and obligations of the surety, if any, obligated under bond relating to the ~~Contract.~~Contract; and

.3 The Subcontractor provides bonds as required by law of prime contractors and by Owner.

...

§ **5.4.2** Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation ~~shall~~ may, in the Owner's sole discretion, be equitably adjusted for increases in cost resulting from the suspension. Such assignment shall not constitute a waiver by Owner of its rights against Contractor, including, but not limited to, claims for defaults, delays or defects for which a subcontractor or material vendor may also be liable.

§ **5.4.3** Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. ~~If the Owner assigns the subcontract to a successor contractor or other entity, the~~

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~~Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.~~Owner shall only be responsible for compensating subcontractors for Work performed or materials furnished from and after the date on which the Owner gives written notice of its acceptance of the subcontract agreement. Owner shall not be responsible for any Work performed or materials furnished by subcontractors prior to the date of Owner's written notice of acceptance.

§ 5.5 Notice Of Subcontractor Default

Contractor shall promptly notify Owner and Architect of any material defaults by any Subcontractor or Sub-subcontractor. Notwithstanding any provision contained in Article 5 to the contrary, it is hereby acknowledged and agreed that Owner has in no way agreed, expressly or implicitly, nor will Owner agree, to allow any Subcontractor, Sub-subcontractor or other materialman or worker employed by Contractor the right to obtain a personal judgment or to create a mechanic's or materialman's lien against Owner for the amount due from the Owner or the Contractor.

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§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this ~~Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.~~Contract.

...

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual ~~agreement.~~ agreement by the Owner and Contractor. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 ~~Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.~~[Paragraph Deleted.]

...

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for site access, staging, introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. ~~The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.~~

§ 6.2.3 All costs resulting from the Contractor's negligence, lack of oversight, inattention to detail, failure to investigate, or failure to follow the Construction Documents or Contract Documents, will be borne by the Contractor. The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate ~~Contractor~~ Contractor, the Architect or any Consultant because of the Contractor's delays, improperly timed activities ~~or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work~~ or defective construction.

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...

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the ~~Architect~~ Owner will allocate the cost among those responsible.

...

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. Changes may be funded out of a contingency fund, if any, or other allowance established herein, or may require a change in the Contract Sum. The authority to approve a change to the Work, the Contract Sum, approve payment from a Contingency or Allowance, or a change in the Project Time, rests solely with the Owner. A Change Order funded from the Contingency or other Allowance shall be referred to herein for clarity as a "Contingency Authorization Order".

§ 7.1.2 A Contingency Authorization Order or Change Order shall be based upon agreement among the Owner, Contractor, and ~~Architect. A Construction Change Directive~~ Architect executed prior to commencement of any Work covered by the Order. A Construction Change Directive (whether funded from contingency, if any, or by an increase in the Contract Sum) requires agreement by the Owner and Architect and may or may not be agreed to by ~~the Contractor.~~ the Contractor prior to the commencement of the Work. An order for a minor change in the Work may be issued by the Architect ~~alone.~~alone, except as otherwise provided herein.

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§ 7.1.4 Change Order Mark-Up. On Change Orders and Construction Change Directives, the total Contractor mark-up for overhead, profit permitted to be charged to the Owner shall be based on the following schedule:

.1 for work performed by the Contractor's own forces, Contractor's mark-up for overhead and profit shall not exceed 10% of the cost of the change in the Work (0% for change orders to be paid out of any contingency allowance).

.2 for the Contractor, for supervision of work performed by the Contractor's Subcontractors, the total Contractor mark-up for overhead and profit shall not exceed 4% of the amount due to the Subcontractors (0% for change orders to be paid out of any contingency allowance).

.3 for each Subcontractor or Sub-subcontractor involved, in Work performed by that Subcontractor's or Sub-subcontractor's own forces, the total mark-up for overhead and profit ten percent (10%) of the cost of the change in the Work.

.4 In no event shall total mark-up for overhead, profit or fee in any work which involves a subcontractor or one or more sub-subcontractors, regardless of who performs the work, exceed 14% of the total cost of the change in the Work. The Contractor will not be allowed an overhead, profit, or fee mark-up when changes in the Work are funded by Contingency or other Allowances provided for in the Contract Documents.

...

Methods used to determine adjustments to the Contract Sum or Guaranteed Maximum Price may include those listed in Section 7.3.3.

§ 7.2.2 Acceptance of a disbursement from any allowance fund, contingency fund or acceptance of a Change Order by the Contractor shall constitute full accord and satisfaction for any and all claims, whether direct or indirect, including but not limited to impact, delay or acceleration damages, arising from the subject matter of the disbursement or Change Order.

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum (the Guaranteed Maximum Price, as applicable) or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract

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consisting of additions, deletions, or other revisions, the Contract Sum ~~and Contract Time being adjusted accordingly.~~(the Guaranteed Maximum Price, as applicable) and Contract Time being adjusted as provided in Section 7.3.3.

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§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract ~~Sum,~~ Sum (or the Guaranteed Maximum Price, as applicable), the adjustment shall be based on one of the following methods:

...

.2 Unit prices stated in the Contract Documents or subsequently agreed ~~upon;~~upon(additional mark-ups for overhead and profit will not be allowed);

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage ~~fee;~~ fee, subject to the limitations of subparagraph 7.1.4; or

...

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract ~~Sum,~~ Sum (or the Guaranteed Maximum Price, as applicable), the Architect shall determine the adjustment on the basis ~~of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4~~ of the amount by which the Contractor's direct costs have actually been increased over the direct cost of performing the Work without the Change in the Work. Direct costs shall be limited to the following:

.1 ~~Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance,~~ Actual documented costs of labor, including applicable payroll taxes and other employee costs approved by ~~the Architect;~~the Owner prior to the approval of the Change Order or Contingency Authorization Order (a labor burden factor will not be accepted as documentation);

.2 ~~Costs~~ Actual documented costs of materials, supplies, and equipment, including cost of transportation, whether such materials, supplies, and equipment are incorporated or consumed;

.3 ~~Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;~~Actual documented rental costs of machinery and equipment, if rented from unaffiliated third-parties, exclusive of hand tools;

.4 ~~Costs~~ Actual documented costs of premiums for all bonds and insurance, permit fees, and applicable sales, use, or similar taxes, directly related to the ~~change;~~ change, if any; and

.5 ~~Costs~~ Actual documented costs of supervision and field office personnel directly attributable to ~~the change.~~the change and only if the adjustment causes an extension of the Contract Time.

The Contractor shall keep and present, in such form as the Architect or Owner may prescribe, an itemized accounting of the items listed above, together with appropriate supporting documentation.

§ 7.3.5 If the Work is performed without an agreement as to the final price, the Contractor shall, at a minimum, retain and provide to the Owner, the following documentation to adequately document its actual costs of performing the scope of work set out in a Construction Change Directive. Adequate Documentation shall include at a minimum, but not limited to, payroll records for employees of Contractor providing the Work included in the Change Directive, as well as written documentation of time spent solely on the scope of the Change Directive Work, prepared concurrent with the performance of the Work, including (for example) sign-in and sign-out sheets or time cards, executed by the employee(s) documenting attendance and receipts for all materials delivered to the Project site for incorporation in the Work of the Change Directive and paid for by the Contractor. If any of the Work of the Change Directive is performed by subcontractors, the Contractor shall provide a copy of the subcontract, an itemized invoice or payment application which includes, in either case, a detailed itemization of costs showing quantities and unit costs of labor and materials extended and totaled and, if permitted, overhead and profit (in accordance with Section 7.1.4) labor and materials provided by the subcontractor, with receipted invoices for all materials incorporated in the Work and evidence of payment by the subcontractor attached. If the Contractor disagrees with the adjustment in the Contract Time, the

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Contract Sum (or the Guaranteed Maximum Price, as applicable), allowed in any Change Directive, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement (by executing and returning the Change Directive) or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract ~~Time.~~Time, not later than ten (10) calendar days following the Contractor's receipt of the Construction Change Directive. A copy of a notice of disagreement shall also be provided to the Owner concurrent with the notice to the Architect. A Notice of Disagreement must contain the number of the Change Directive, the date the Change Directive was issued and the words **"Notice of Disagreement With Change Directive"** in the Subject line. It is imperative that Owner receive timely specific notice of any potential problem identified by Contractor in order that the problem can be mitigated or resolved promptly.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum ~~and~~ and/or the Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost ~~as confirmed by the Architect.~~ plus the permitted overhead and profit as set forth in Section 7.1.4. When both additions and credits covering related Work or substitutions are involved in a change, both changes shall be shown on the same Change Order and the permitted allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change. Returned materials shall be credited at actual cost and no penalty or restocking fee shall be permitted to be charged to the Owner.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will require as a condition precedent to certification of payment for Work completed under the Construction Change Directive that the Contractor provide the documentation required by Section 7.3.4, and based on such documentation, shall make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect is specifically authorized by this Section 7.3.9 to require submission of such documentation and any other documentation required to evaluate the requested payment, and shall withhold payment certification until such documentation is received and an interim determination is made in accordance with this Section. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change ~~Order.~~ Order reflecting the Agreement of the Owner and Contractor. Change Orders may be issued for all or any part of a Construction Change Directive.

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~~The~~ With prior written notice to the Owner's representative, the Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time. The Contractor shall carry out such written orders promptly. Minor changes in the Work shall not include changes that involve the outward appearance of the structure, color schemes, floor plans, building materials, landscaping, or mechanical equipment.

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§ 8.1.1 **Contract Time.** Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 **Commencement.** The date of commencement of the Work ~~is the date established in the Agreement.~~shall be the first business day following the Contractor's written notice to proceed. The notice to proceed shall not be issued until the Agreement (or Guaranteed Maximum Price Amendment, as applicable) has been signed by the Contractor and the Owner, and the Owner and Architect have received and approved as to form all required payment and performance bonds and insurance as required by Article 11.

§ 8.1.3 ~~The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.~~**Substantial and Final Completion**

§ 8.1.3.1 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.3.2 The date of Final Completion is the date certified by the Architect in accordance with Section 9.10. Unless otherwise agreed in writing by Owner, Contractor agrees that Final Completion shall occur not more than thirty (30) days after the date of Substantial Completion.

§ 8.1.4 **Day.** The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

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§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor ~~confirms~~ stipulates that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the ~~Contractor and Owner.~~Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance.

...

§ 8.2.4 Liquidated Damages

§ 8.2.4.1 If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time, the Owner shall be entitled to retain or recover from the Contractor and the Contractor's surety, as liquidated damages and not as a penalty, the per diem amounts set out in the AIA Document A101 (2017) or the AIA Document A133 (2019) into which these General Conditions are incorporated and executed concurrently with these General Conditions, commencing upon the first day following expiration of the Contract Time and continuing until the actual Date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable estimate of damages the Owner will incur as a result of delayed completion of the Work.

§ 8.2.4.2 In the event Substantial Completion is not achieved by the designated date, or as it may be extended, Owner may withhold payment of any further sums due until Substantial Completion is achieved. Owner shall also be entitled to deduct out of any sums due to Contractor all liquidated damages, if any, due Owner in accordance with the Contract Documents.

§ 8.2.4.3 In addition to Liquidated Damages, if any, the Contractor shall reimburse the Owner for any Supplemental or Additional Services of the Architect for additional site visits made necessary by the fault, neglect or request of the Contractor or caused by Contractor's failure to achieve the applicable Contract Time requirements.

§ 8.2.4.4 If one or more of the Liquidated Damages provisions set out in the Agreement are held to be legally unenforceable as a penalty (except when the holding is the result of a challenge by the Owner), the Owner shall be allowed to recover actual damages caused by the Contractor's failure to achieve the applicable Contract Time requirements.

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by ~~(1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties,~~ war, civil commotion, pandemic, epidemic, federal, state or local declared disaster or public emergency, act of God, governmental restrictions,

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regulations, orders, or interference, fire or other unavoidable casualty, material changes ordered in the Work; adverse weather conditions documented in accordance with Section ~~15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution;~~ 15.1.6 by delay authorized in writing by the Owner prior to the happening of the delay event; or (5) by other causes that the Contractor asserts, and the Architect ~~determines,~~ and Owner determine, justify delay, then the Contract Time ~~shall~~ may be extended for such reasonable time as the Architect ~~may determine.~~and Owner may determine based upon documentation by the Contractor.

§ 8.3.1.1 The adjustment of the Contract Time for delay, disruption, and interference described in this Section 8.3.1 is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Time and Contractor's timely delivery of the notice and claim as set out in this Section 8.3.1. An adjustment to the Contract Time shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this Section 8.3.1, and under no circumstances shall the Owner be liable to pay the Contractor any compensation for Owner-caused delays.

§ 8.3.1.2 Notice and Claim for Extension. In the event of a delay in the commencement or progress of the Work as a result of any of the circumstances in this Section 8.3.1, the Contractor may receive an extension of time for completion of the Work equal to the delay, if the Contractor delivers a written notice and claim to the Owner and Architect delivered in any manner provided in Section 1.6.1 of this Agreement. The Notice shall identify and provide a reasonably detailed description of the circumstances causing the delay, disruption, or interference to the Contractor's performance or progress of the Work on or before the due date of Contractor's Application for Payment covering the period in which the delay began. Claims for an extension of time shall be stated in whole or half calendar days, as applicable. The actual date on which the delay(s) began and/or the date the delay ended, if applicable, must be stated in the Claim Notices as applicable.

§ 8.3.2 ~~Claims relating to time shall be made in accordance with applicable provisions of Article 15.~~In the case of claims for extension of time because of unusually inclement weather, such extension of time may be granted only if the Contractor files a claim in accordance with the requirements set out in Section 15.1.6.

§ 8.3.3 ~~This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.~~Contractor shall not be entitled to an adjustment in the Contract Time for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

§ 8.3.4 Any adjustment of the Contract Time authorized under Section 8.3 shall be conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Time and Contractor's submission of a timely and properly documented Notice and Claim for additional time in accordance with Section 8.3.

§ 8.3.5 Adjustments to the Contract Time addressed in this Section 8.3 shall apply only to requests for extensions of time based upon delay, disruption, or interference to the Contractor's performance or progress of the Work and shall have no applicability to requests for adjustment of the Contract Time due to other changes in circumstance, including but not limited to: a change in the materials used; a change in the specified manner of constructing and/or installing the Work; or additional labor, services or materials required, beyond those specified by the Contract Documents. Claims for an adjustment of the Contract Time resulting from these kinds of changes shall be authorized only pursuant to a written order or directive from Owner authorizing Contractor to proceed with a change in the Work in accordance with the Contract Documents.

§ 8.4 No Damages or Other Compensation for Delay or Acceleration

This Agreement does not permit recovery by the Contractor of damages or additional compensation for delay, acceleration, disruption, or interference to the Contractor's performance or progress of the Work Contractor agrees that Contractor shall be fully compensated for all delays solely by an extension of time including but not limited to delay, disruption, or interference caused by the Owner the Architect, of an employee of either, or of a Separate Contractor, any of the circumstances set out in Section 8.3.1 or acceleration of the Work required by the Owner in accordance with the terms of this Agreement. Contractor's sole remedy for delay disruption, or interference in its performance or progress of the Work or any required acceleration of the Work shall be the grant of an extension of time for completion equal to a delay or such reasonable time as the Owner and Architect may determine in their sole discretion.

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§ 9.1.1 The Contract Sum is stated in the Agreement or the Guaranteed Maximum Price Amendment in the case of a Construction Manager at Risk Contract and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. All costs of overtime Work required by the Contract Time and the nature of the Work, as set forth in or inferable from the Contract Documents, except costs of emergencies covered in Section 10.4, shall be and are included in the Contract. The Contract Sum shall not be increased because the Contractor experiences an unexpected or unforeseeable increase in the price of labor or materials required to complete the Project.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices ~~shall be equitably adjusted.~~may be equitably adjusted by written agreement between the Owner and Contractor, executed prior to an order being placed based on the unit prices.

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Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, as applicable, the Contractor shall submit a schedule of values to the Architect before the first Application for ~~Payment,~~ Payment or, in the case of a Guaranteed Maximum Price, concurrent with the Guaranteed Maximum Price Proposal, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, or the Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment. The schedule of values shall be prepared in such a manner that each major item of work, whether done by Contractor's own forces or subcontracted, is shown as a single line item on AIA Documents G702-1992 and G703-1992, Application and Certificate for Payment and Continuation Sheet.

...

§ 9.3.1 ~~At least ten days before the date established for each progress payment,~~ In accordance with the requirements of Section 5.1 of the Agreement, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage ~~if provided for in the Contract Documents.~~withheld. The form of Application for Payment, duly notarized, shall be a current authorized edition of AIA Document G702-1992, Application and Certificate for Payment, supported by a current authorized edition of AIA Document G703-1992, Continuation Sheet.

§ 9.3.1.1 ~~As provided in Section 7.3.9, such~~ Such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor ~~does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.~~has not been invoiced by a Subcontractor or supplier, unless such Work was self-performed; in such case, only portions of Work actually performed shall be included on the Contractor's request for payment.

§ 9.3.1.3 Contractor agrees that, for purposes of Texas Government Code section 2251.042, receipt of the Application for Payment by the Architect shall not be construed as receipt of an invoice by the Owner. Contractor further agrees that Owner's receipt of the Architect's Certificate for Payment shall be construed as a receipt of an invoice by the Owner, for purposes of Texas Government Code section 2251.042.

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§ 9.3.1.4 The Owner shall withhold retainage as provided in the Agreement, except that Owner shall not pay amounts for which the Architect refuses to certify payment, or the Owner refuses to pay, as provided herein. The retainage shall be paid to the Contractor with the Final Payment, subject to the requirements of the Contract Documents.

§ 9.3.2 Unless otherwise provided in ~~the Contract Documents, payments shall~~ a separate written agreement executed between the Owner and Contractor prior to delivery, payments shall not be made on account of materials and equipment delivered and ~~suitably~~ stored at the site or off-site for subsequent incorporation in the Work. ~~If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.~~ The Owner may, in Owner's sole discretion, require Contractor's compliance with such reasonable procedures and requirements as it may establish, as a condition precedent to the grant of Owner's consent and agreement to payment, including but not limited to the following:

.1 provision of any additional insurance required to protect the materials and equipment while stored;

.2 payment of the costs to store the materials and equipment and any additional transportation costs for multiple deliveries;

.3 provision of written consent of Contractor's surety to such storage;

.4 submission of an affidavit identifying materials and equipment stored off-site for later incorporation into the Work, and acknowledging responsibility for such materials and equipment;

.5 provision of documentation that the facility where the materials and/or equipment will be stored is an adequately insured commercial warehouse, where the materials and equipment stored will be sheltered from the weather and outside elements and are stored in accordance with the manufacturer's instructions, including proper temperature and humidity controls and that the materials and equipment have been physically separated and marked for the Project;

.6. its agreement to bear the cost of Owner and/or Architect's visits to the off-site storage facility to confirm compliance with these requirements and review the stored contents, and Contractor shall agree to allow such costs to be offset from Progress Payments;

.7 agreement that payment of any costs related to compliance with the procedures and requirements for storage of materials and equipment on or off-site, shall not be subject to charges for overhead or profit;

.8 submission of bills of sale or other documentation acceptable to the Owner, showing proof of delivery and establishing the Owner's title to the materials or equipment and/or otherwise protecting the Owner's interest, including naming the Owner as additional insured on the required insurance policy (naming the specific materials or equipment stored and their location) and providing proof of delivery for those materials and equipment;

.9 agreeing that, in the event of termination of the Contract or default by the Contractor, the material and equipment stored on or off-site shall be immediately turned over to the Owner by delivery to the location designated by the Owner and that the operator of the storage facility is aware of this agreement and willing to honor it; and

.10 agreeing that all such stored materials and equipment, to the extent they include mechanical components, will be maintained by the Contractor kept in good working condition and ready for immediate installation, to the same extent they would have been, had they been delivered "just in time" for installation, that Contractor will be solely responsible for assuring any manufacturer's warranty will commence on date of completion of installation and/or start-up of the material or equipment and for repairs required prior to installation to assure performance in accordance with the Contract Documents.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work. **CONTRACTOR SHALL INDEMNIFY AND HOLD OWNER HARMLESS FROM ANY LIENS, CLAIMS, SECURITY INTERESTS OR ENCUMBRANCES FILED BY A SUPPLIER, SUBCONTRACTORS, OR ANYONE CLAIMING BY, THROUGH OR UNDER THE CONTRACTOR OR SUBCONTRACTOR FOR ITEMS COVERED BY PAYMENTS PREVIOUSLY MADE BY THE OWNER TO CONTRACTOR FOR ITEMS COVERED BY PAYMENTS MADE BY THE OWNER TO CONTRACTOR.**

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§ 9.3.4 In each Application for Payment, Contractor shall certify that: the information contained in the Application presented is true, correct, accurate and complete; that the submitted Work has been completed to the extent represented in the Applications for Payment; that the materials and supplies identified in the Applications for Payment have been purchased, paid for, and, unless an agreement described in Paragraph 9.3.2 has been signed, incorporated into the Work; that the subcontractors whose work is identified in the Applications for Payment have been paid, or Contractor has been invoiced for same and intends to pay such subcontractors; there are no known mechanics' or materialmens' liens outstanding at the date of the Application, that all due and payable bills with respect to the Work have been paid to date or are included in the amount requested in the current Application and that except for such bills not paid but so included, there is no known basis for the filing of any mechanics' or materialmens' liens on the Work, and that releases from all contractors and materialmen have been obtained in such form as to constitute an effective release of lien under the laws of the State of Texas covering all Work theretofore performed and for which payment has been made by Owner to Contractor.

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§ 9.4.1 The Architect will, ~~within seven days after receipt of the Contractor's Application for Payment,~~ carefully evaluate and review the Application for Payment and, when appropriate, return the Application for Payment to the Contractor as provided in Section 9.4.2. If the Application for Payment is complete, then the Architect shall sign and, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner in writing, of the Architect's reasons for withholding certification in part as provided in ~~Section 9.5.1;~~ Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner in writing, of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. Architect's written reasons for withholding certification shall be construed as the notice required by Texas Government Code Section 2251.042 *et seq.*

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, that the Architect has observed the progress of the Work and determined that, in the Architect's professional opinion based on the Architect's evaluation of the Work and the data in the Application for Payment, ~~that, to the best of the Architect's knowledge, information, and belief,~~ the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the ~~Architect.~~ Architect in writing to the Owner. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data unless requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum. Examinations, audits, and verifications, if required by the Owner, will be performed by the Owner's accountants or other representatives of the Owner acting in the sole interest of the Owner.

§ 9.4.3 The issuance of a Certificate for Payment shall constitute a recommendation to the Owner regarding the amount to be paid. This recommendation is not binding on the Owner if Owner knows of other reasons under the Contract Documents why payment should be withheld.

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§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because ~~of~~of:

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.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; ~~or~~

.7 repeated failure to carry out the Work in accordance with ~~the Contract Documents.~~ the Contract Documents;

.8 delay beyond the times set forth elsewhere in the Contract Documents including but not limited to the submission for approval of the schedule of values, cost breakdowns on proposal requests, progress schedule, list of Subcontractors and insurance requirements;

.9 failure to submit a written plan indicating action by the Contractor to regain the time schedule for completion of Work within the Contract Time;

.10 evidence of financial inability to perform the Contract fully;

.11 failure to submit record documents required by the Contract; or

.12 failure of the Contractor to perform any other obligations of the Contract.

§ 9.5.2 ~~When either party disputes the Architect's~~ If the Contractor disputes the Architect's or the Owner's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, ~~that party~~ the Contractor may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld. The Owner shall not be deemed in default by reason of withholding payment as provided for in Section 9.5.1.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment. Notwithstanding any provision contained within this Article, if the Contractor has not achieved Substantial Completion by the required date, subject to extensions of time allowed under the Contract Documents, then Architect may withhold any further Certificate for Payment to the extent necessary to preserve sufficient funds to complete construction of the Project and to cover liquidated damages. The Owner shall not be deemed in default by reason of withholding payment as provided for in Section 9.5.1, or this Section 9.5.4.

§ 9.6.1 After the Architect has issued and the Owner has approved a Certificate for Payment, the Owner shall make payment of disputed amounts in the manner and within the time provided in the Contract Documents, and ~~shall so notify the Architect.~~ in accordance with the Texas Government Code section 2251.042 *et. seq.*, Owner shall within twenty-one (21) days notify the Architect and Contractor if Owner disputes the Architect's Certificate for Payment, listing the specific reasons for nonpayment. Payments to the Contractor shall not be construed as releasing the Contractor or his Surety from any obligations under the Contract Documents.

§ 9.6.2 ~~The Contractor shall pay each Subcontractor, no later than seven days after~~ In compliance with Texas Government Code Section 2251.022, the Contractor shall, within ten (10) days following receipt of payment from the Owner, ~~the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.~~ pay all bills for labor and materials performed and furnished by others in connection with the construction, furnished and equipping of the improvements and the performance of the Work, and shall, if requested, provide the Owner with evidence of such payment. Contractor's failure to make payments within such time shall constitute a material breach of this contract. Contractor shall include a provision in each of its contracts imposing the same payment obligations on its Subcontractors as are applicable to the Contractor hereunder. If the Contractor has failed to make payment promptly to the Contractor's Subcontractors or for materials or labor used in the Work for which the Owner has made payment to the Contractor, the Owner shall be entitled to withhold payment to the Contractor in part or in whole to the extent necessary to protect the Owner.

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§ 9.6.7 ~~Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for~~ The Contractor shall, as a condition precedent to any obligation of the Owner under the Contract Documents, provide to the Owner payment and performance bonds in the full penal amount of the Contract in accordance with Texas Government Code Chapter 2253. Notwithstanding the foregoing, payments received by the Contractor from the Owner for Work properly performed by Subcontractors, or materials properly provided by suppliers, shall be held in trust by the Contractor for the benefit of those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the ~~Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.~~Contractor.

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~~If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the~~ Pursuant to Texas Government Code Section 2251.051,if the Owner does not pay the Contractor ~~within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days'~~ any payment certified by the Architect, which is undisputed, due and owing after the date the payment is due under the Contract Documents, then the Contractor may, upon ten (10) days' written notice to the Owner and Architect, that payment has not been made and the Contractor intends to suspend performance for nonpayment, may stop the Work until payment of the ~~amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.~~undisputed amount owing has been received. If the Owner provides written notice to the Contractor that: 1) payment has been made; or 2) a bona fide dispute for payment exists, listing the specific reasons for nonpayment, then Contractor shall be liable for damages resulting from suspension of the Work. If a reason specified is that labor, services, or materials provided by the Contractor are not provided in compliance with the Contract Documents, then the Contractor shall be provided a reasonable opportunity to cure the noncompliance or to compensate Owner for any failure to cure the noncompliance. No amount shall be added to the Contract Sum as a result of a dispute between Owner and Contractor unless and until such dispute is resolved in Contractor's favor.

§ 9.7.1 If the Owner is entitled to reimbursement or payment from the Contractor under or pursuant to the Contract Documents, then such payment shall be made promptly upon demand by the Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if the Contractor fails to promptly make any payment due to Owner, pursuant to the Contract, or if the Owner incurs any costs and expenses to cure any default of the Contractor or to correct defective Work, then the Owner shall have an absolute right to offset such amount against the Contract Sum and, in the Owner's sole discretion and without waiving any other remedies, may elect to either: (1) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due to Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

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§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended ~~use.~~use; provided, however, as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project (or if the same cannot be delivered for reasons not the fault or responsibility of the Contractor, nevertheless all Contractor's obligations necessary to the issuance of such certificates, permits, approvals, or licenses will have been performed.) Without limiting the foregoing, in general, the only remaining Work following Substantial Completion shall be minor in nature, so that the Owner could occupy the Project on that date and the completion of the Work by the Contractor would not materially interfere or hamper the Owner's normal business operations. To be substantially complete, Contractor shall be complete with all required testing, HVAC Test, Adjust and Balancing and Commissioning of electrical systems, HVAC systems, Building Automation Control Systems and other systems as applicable as required

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by the Contract Documents (including project manual), project specifications and drawings and the International Energy Conservation Code with Preliminary Report(s) being issued to Engineer and Owner for acceptance. Reports shall include a complete list of deferred testing or deficiencies that requires further remediation.

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§ 9.8.3 Upon receipt of the Contractor's list, the Architect accompanied by the Owner or Owner's representative, at the Owner's option, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, then the Architect shall so notify the Contractor and Owner in writing, and the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.3.1 If, in Architect's opinion during the inspection, the Project, or the designated portion thereof which Owner has agreed to accept separately, is not sufficiently complete to warrant inspection, or if the list of items to be completed or corrected is not sufficiently complete to warrant inspection, then Architect may terminate the inspection and notify the Contractor that the Project is not ready for inspection. If for such reasons, Architect is required to make additional inspections, the Owner may deduct the cost of Architect's additional services made necessary thereby from any payments due the Contractor. The Architect's compensation shall be determined in accordance with the applicable provisions of the Agreement between the Owner and Architect.

§ 9.8.3.2 Except with the consent of the Owner, the Architect will perform no more than ONE (1) inspection to determine whether the Work has attained Substantial Completion in accordance with the Contract Documents. The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect, Engineer, Consultant or service provider for any additional inspections.

§ 9.8.4 When the Work or designated portion thereof is ~~substantially complete,~~ Substantially Complete, as defined by the Contract Documents, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion ~~thereof~~ thereof, unless otherwise provided in the Certificate of Substantial Completion. If Work is to be completed or corrected after the date of Substantial Completion and prior to final payment, Warranties for Work to be completed or corrected after the date of Substantial Completion and prior to final payment shall become effective on the later of the date the Work is completed or corrected and accepted by the Owner and Architect, or the date of Final Payment. ("Warranty Commencement Date").

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. ~~Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.~~

§ 9.8.6 Retainage is not due to the Contractor until thirty-one (31) days after Final Completion of the Work as set out in Section 9.10. After the Certificate of Substantial Completion is accepted by the Owner, the Owner may, in its sole discretion and upon acceptance and consent of surety, make payment of retainage on all or a part of the Work accepted.

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§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to in writing by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work resulting from such occupancy, use or installation, and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of

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warranties ~~required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2.~~ on the partially completed portion of the Work, as required by the Contract Documents. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect. Contractor agrees that the Owner may place and install as much equipment and furnishings as is possible before completion or partial completion of portions of the Work.

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§ 9.9.3 Unless ~~otherwise agreed upon,~~ expressly agreed upon in writing, partial occupancy or use of a portion or portions of the Work or installation of furnishings and equipment shall not constitute acceptance of Work not complying with the requirements of the Contract ~~Documents.~~Documents, nor shall it constitute evidence of Substantial Completion or Final Completion.

...

§ 9.10.1 ~~Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract~~ When all of the Work is finally completed and the Contractor is ready for a final inspection it shall notify the Owner and the Architect thereof in writing. Thereupon, the Architect and Owner (at Owner's option) will make final inspection of the Work and, if the Work is complete in full accordance with the Contract Documents and this Contract has been fully performed, the Architect will promptly issue a final Certificate for Payment ~~stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the~~ certifying to the Owner that the Work has been completed in accordance with the Contract Documents and that ~~the entire balance found to be due the Contractor~~ remainder of the Contract Sum, including all retainage, less any amount withheld pursuant to the Contract and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. Except with the consent of the Owner, the Architect will perform no more than one (1) inspection to determine whether the Work has attained Final Completion in accordance with the Contract Documents. Final Certificate for Payment and release of retainage will not be considered unless all testing, HVAC Test, Adjust, and Balance, and Commissioning reports required by the Contract Documents (including project manual), project specifications and drawings and the International Energy Conservation Code are provided in their FINAL format showing that all findings of noncompliance have been corrected. If the Architect is unable to issue its final Certificate for Payment and is required to repeat its final inspection of the Work, the Contractor shall bear the cost of such repeat final inspection(s) which cost may be deducted by the Owner from the Contractor's final payment. The project Architect/Engineer for this project will not issue a Final Certificate of Payment and release of retainage unless all testing, HVAC Test, Adjust, and Balance, and Commissioning reports required by the Contract Documents (including project manual), project specifications, and drawings and the International Energy Conservation Code are provided in their FINAL format showing that all findings of noncompliance have been corrected.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) ~~an~~ its affidavit that payrolls, bills for materials and equipment, and other ~~indebtedness~~ liabilities connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) ~~if required~~ except for amounts previously withheld by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may have been fully paid or otherwise satisfied; releases and waivers of liens from all Subcontractors of the Contractor and of any and all other parties required by the Architect or the Owner; such other provisions as Owner may request; and consent of Surety to final payment. If any third party fails or refuses to provide a release of claims or waiver of lien as required by Owner, the Contractor shall furnish a bond satisfactory to the Owner to ~~indemnify the~~

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~~Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.~~discharge any such lien or indemnify the Owner from liability; (7) In addition, the following items must be completed and received by the Owner before Final Payment will be due:

.1 Written certifications required by Sections 10.5, 10.6, and 10.7 herein;

.2 Final list of subcontractors (AIA Document G705-2001);

.3 Contractor's Certification of Project Compliance required by 16 Texas Administrative Code, Section 61.1036, located at: https://tea.texas.gov;

.4 Contractor's warranties, organized as required elsewhere in the Contract Documents;

.5 Maintenance and Instruction Manuals;

.6 Owner's Certificate of Final Completion; and

.7 "As-constructed record drawings". At the completion of the Project, the Contractor shall submit one complete set of "as-constructed" record drawings, with all changes made during construction, including concealed mechanical, electrical, and plumbing items. The Contractor shall submit these as electronic, sepia, or other acceptable medium, in the discretion of the Owner. The "as-constructed" record drawings shall delete the seal of the Architect and/or the Engineer and any reference to those firms providing professional services to the Owner, except for historical or reference purposes.

Documents identified as affidavits must be notarized. All manuals will contain an index listing the information submitted. The index section will be divided and identified by tabbing each section as listed in the index. Upon request, the Architect will furnish the Contractor with blank copies of the forms listed above.

§ 9.10.3 ~~If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it~~ The Owner shall make final payment of all sums due the Contractor not more than thirty-one (31) days after the Architect's execution of a final Certificate for Payment. Final Payment shall not constitute a waiver of ~~Claims.~~any Claims by the Owner.

§ 9.10.4 ~~The making of final payment shall constitute a waiver of Claims by the Owner except those arising from~~

~~.1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;~~

~~.2 failure of the Work to comply with the requirements of the Contract Documents;~~

~~.3 terms of special warranties required by the Contract Documents; or~~

~~.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.~~[Paragraph Deleted.]

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously ~~made in writing~~ asserted pursuant to Article 15 and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.10.6 The Contractor shall not permit any actual or purported lien, charge or claim to attach or attempt to attach to the Work, the site or any amounts due or to become due to the Contractor under the Contract Documents. If any such lien, charge or claim is so asserted, the Contractor shall promptly procure its release and indemnify the Owner against all damage and expense incident thereto. Upon completion of the Work and before any final payment and settlement, the Contractor shall provide evidence satisfactory to the Owner of payment and release of all debts, taxes, liens, charges, obligations and claims for or relating to labor, materials, Subcontractors and Sub-subcontractors; provided, however, that if the Contractor has not paid for any of the aforesaid as a result of a bona fide dispute, and payment of such is guaranteed and covered by the payment bond provided by the Contractor, then the Contractor shall not be required to pay such claim as a condition to final payment and settlement, but instead shall be required to provide Owner with written consent to final payment executed by such surety, expressly acknowledging the existence of such

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unpaid claim, and agreeing that full and final payment to the Contractor shall not impair any of the Owner's rights or the surety's obligations under the bond.

§ 9.11 Audit
Contractor agrees to maintain adequate books, payrolls and records satisfactory to the Owner in connection with any and all Work performed hereunder. Contractor agrees to retain all such books, payrolls and records (including data stored in computer) for a period of not less than three (3) years after completion of the Work. At all reasonable times, Owner and its duly authorized representatives shall have access to all personnel of Contractor and all such books, payrolls and records, and shall have the right to audit same.

§ 9.12 In addition to any liquidated damages payable to the Owner by the Contractor, if: (1) the Architect is required to make more than one (1) inspection for Substantial Completion; (2) the Architect is required to make more than 1 inspection for Final Completion; or (3) the Work is not substantially complete within thirty (30) days after the date established for Substantial Completion in the Contract Documents; the Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for any additional inspections or services.
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The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the ~~Contract.~~Contract and shall conform to all provisions of the "Manual of Accident Prevention in Construction", published by the Associated General Contractors of America, Inc., latest edition, and the Contractor further agrees to fully comply with all safety standards required by the Occupational Safety and Health Administration ("OSHA") 29 USC Section 651 et seq., and all amendments thereto. However, the Contractor's duties herein shall not relieve any Subcontractor or any other person or entity, including any person or entity required to comply with all applicable federal, state and local laws, rules, regulations, and ordinances, from the obligation to provide for the safety of their employees, persons, and property and their requirements to maintain a work environment free of recognized hazards. Contractor shall provide reasonable fall protection safeguards and provide approved fall protection safety equipment for use by all exposed Contractor employees.

§ 10.1.1 Contractor shall ensure that the Project site is alcohol-free, drug-free, nicotine/ tobacco-free, e-cigarette free, weapon-free, and sexual-harassment free, and shall require strict compliance on the Project Site with the Owner's Board Policies, including but not limited to GKA(Legal) and GKA(Local). Contractor will remove any of its employees from performing the Work any time there is suspicion of alcohol and/or drug use, possession, or impairment involving such employee, and at any time an incident occurs where drug or alcohol use could have been a contributing factor. Owner has the right to require Contractor to remove employees from performing the Work any time cause exists to suspect alcohol or drug use. In such cases, Contractor's employees may only be considered for return to work after the Contractor certifies as a result of a for-cause test, conducted immediately following removal that said employee was in compliance with this contract. Contractor will not use an employee to perform the Work who either refuses to take, or tests positive in, any alcohol or drug test.

10.1.2 Dress Code, Fraternization and Sexual Harassment. Contractor shall require adequate dress of the Contractor's forces consistent with the nature of the Work being performed, including wearing shirts at all times. Contractor shall prohibit fraternization between all persons working under Contractor or any of its subcontractors, students and Owner's employees while on Owner's property. Sexual harassment of employees of the Contractor or employees or students of the Owner by employees of the Contractor is strictly forbidden. Any employee of the Contractor who is found to have engaged in such conduct shall be subject to appropriate disciplinary action by the Contractor, including removal from the job site.

§ 10.1.3 Weapons. Owner has also banned use, possession, or display of any firearm, handgun, location-restricted knife, club, or "prohibited weapon", as defined by the Texas Penal Code and Owner's Board Policy FNCG(Legal), except when the Contractor, its representatives, employees, agents, and subcontractors, or anyone else over which the Contractor has control or authority holds a Texas handgun license, stores the handgun or other firearm in a locked vehicle in the Owners parking lot, garage, or other parking area provided by the Owner AND the firearm is not loaded and not in plain view. A copy of such policy is available through a link on the Owner's website. The Contractor further agrees that Contractor's representatives, employees, agents, and subcontractors will abide by these requirements as well as the Federal Gun-Free School Zones Act.

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§ 10.1.4 Tobacco and E-Cigarettes. Contractor's employees, agents, Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, shall not use e-cigarettes or tobacco products while on the Project Site.

§ 10.1.5 Small Unmanned Aircraft (Drones). The Contractor shall operate any Small Unmanned Aircraft as required by 14 C.F.R. Part 107. as applicable, and any other applicable federal or state laws and regulations.
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§ 10.2.1 The Contractor shall maintain good order among its employees and its Subcontractors, shall confine its employees and Subcontractors to such work areas, roads and gates as directed by the Owner, take reasonable and necessary precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss ~~to~~to:

.1 employees on the ~~Work~~ Work, school personnel, students and other persons on the Owner's premises and other persons who may be affected ~~thereby;~~thereby, which protection shall include the installation of fencing between the Work site and the occupied portion of a connecting or adjacent educational facility, and taking reasonable precautions to secure any abusable glue, aerosol paint, or any other chemical substance for inhalation being used on the project site;

...

.3 other property at the site or adjacent thereto, such as fences, trees, shrubs, lawns, walks, athletic fields and tracks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction. Contractor's obligations under this Section shall continue to apply during any time period when all or a portion of the Work is suspended for any reason. Contractor's obligations under Section 10.2 as to each portion of the Project shall continue until Owner takes possession of and occupies that portion of the Project.

...

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including installing fencing, posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property adjacent to the Project and improvements therein. Any damage to such property or improvements shall be promptly repaired by the Contractor. Contractor shall provide reasonable fall protection safeguards and provide approved fall protection safety equipment for use by all exposed Contractor employees.

§ 10.2.4 When use or storage of ~~explosives or other~~ hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified ~~personnel.~~personnel, and shall only conduct such activities after giving reasonable advance written notice of the presence or use of such materials, equipment or methods to Owner and Architect. The storage of explosives on Owner's property is prohibited. The use of explosive materials on Owner's property is prohibited unless expressly approved in advance in writing by Owner and Architect.

§ 10.2.5 ~~The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.~~[Paragraph Deleted.]
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~~If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be~~

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~~given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.~~ **§ 10.2.8.1** If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 3 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter. No provision of the Contract Documents shall waive Owner's immunity under the Texas Tort Claims Act, Texas Civil Practice and Remedies Code, Chapter 101.

§ 10.2.8.2 The Contractor shall promptly report in writing to the Owner and Architect all accidents arising out of or in connection with the Work which cause death, bodily injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious bodily injuries, or serious property damages are caused, then the accident shall be reported immediately by any means necessary to give actual notice to the Owner's representative and the Architect.

...

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition. If such notice is provided orally, written confirmation of such notice by Contractor shall be provided not later than one (1) business day following such notification. Owner shall not be responsible for materials or substances brought to the site by the Contractor.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner ~~shall~~ shall, as soon as reasonably possible, obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. ~~By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.~~ Contractor may be entitled to an extension of the Contract Time in accordance with Article 8.3.

§ 10.3.3 To the ~~fullest extent permitted by law,~~ extent permitted by the laws and Constitution of the State of Texas, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity. Notwithstanding anything to the contrary contained in this Section 10.3.3, the agreement of the Owner to indemnify, defend and hold harmless the parties described in this Section shall not extend or apply to claims, damages, losses, expenses or liabilities related to, created or caused in whole or in part by a party indemnified hereunder; it being agreed and understood that the Owner and any party so indemnified shall each bear liability for its own negligent acts or omissions, and that such indemnity shall extend only to liability for the negligent acts and omissions of the Owner.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. ~~The Owner~~

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~~shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.~~

§ 10.3.5 ~~The Contractor shall reimburse~~ Except to the extent that the cost and expense are due to the Owner's fault or negligence, if Contractor imports hazardous materials onto the Project site, the Contractor shall indemnify and hold harmless the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, ~~or~~ (2) where the Contractor fails to perform its obligations under ~~Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.~~Section 10.3.1; and (3) any fines or penalties of government agencies directly resulting from the Contractor's importation of the hazardous materials onto the Project site.

§ 10.3.6 ~~If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.~~[Paragraph Deleted.]

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~~In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.~~§ 10.4 .1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

§ 10.4.2 The performance of the foregoing services by the Contractor shall not relieve the subcontractors of their responsibility for the safety of persons and property and for compliance with all federal, state and local statutes, rules, regulations and orders of any governmental authority applicable to the conduct of the Work.

§ 10.5 Asbestos Or Asbestos-Containing Materials. Contractor shall submit to the Architect a written certification addressed to the Owner that all materials used in the construction of this Project contain less than 0.10% by weight of asbestos and for which it can be demonstrated that, under reasonably foreseeable job site conditions, will not release asbestos fibers in excess of 0.1 fibers per cubic centimeter. The written certification shall further state that, should asbestos fibers be found at this Project in concentrations greater than 0.1 fibers per cubic centimeter, then Contractor shall be responsible for determining which materials contain asbestos fibers and shall take all necessary corrective action to remove those materials from the Project, at no additional cost to the Owner. The written certification shall be dated, shall reference this specific Project and shall be signed by not less than two (2) officers of the Contractor. Final Payment shall not be made until this written certification has been received.

§ 10.6 Lead-Free Material In Potable Water System

§ 10.6.1 Prior to payment of retainage and final payment, the Contractor and each subcontractor involved with the potable water system shall furnish a written certification that the potable water system is "lead-free".

§ 10.6.2 The written certification shall further state that should lead be found in the potable water system built under this Project, then Contractor shall be responsible for determining which materials contain lead and shall take all necessary corrective action to remove lead from the Project, at no additional cost to the Owner. The written certification shall be dated, shall reference this specific Project and shall be signed by not less than two (2) officers of the Contractor.

§ 10.7 Hazardous Materials Certification

The Contractor shall provide written certification that no materials used in the Work contain lead or asbestos materials in them in excess of amounts allowed by federal, state or local standards, laws, codes, rules and regulations; the Federal Environmental Protection Agency (EPA) standards; and/or the Federal Occupational Safety and Health Administration (OSHA) standards, whichever is most restrictive. The Contractor shall provide this written certification as part of submittals under the Section in the Project Manual related to Contract Closeout.

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§ 11.1 Contractor's Insurance ~~and Bonds~~

§ 11.1.1 The Contractor and the Contractor's Subcontractors shall purchase and maintain in force, insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the table below the Agreement or elsewhere in the Contract Documents. No Work will be commenced, and no equipment or materials may be shipped, until all requirements of Article 11 have been satisfied, satisfactory evidence of insurance has been provided, and all required insurance is in full force and effect. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the ~~jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.~~State of Texas.

Workmen's Compensation: (Including Waiver of Subrogation Endorsement)	All liability arising out of Contractor's employment of workers and anyone for whom Contractor shall be liable for Worker's Compensation claims. Worker's Compensation is required and no "alternative" form of insurance shall be permitted.
Employer's Liability:	$1,000,000.00
Commercial General Liability: Each Occurrence General Aggregate Personal & Advertising Injury Products and Completed Operations	 $3,000,000.00 $5,000,000.00 (A Designated Construction Project General Aggregate Limit shall be provided) $1,000,000.00 each person $1,000,000.00 (for one (1) year, commencing with issuance of final Certificate for Payment)
Property Damage Independent Contractors Contractual Liability	$2,000,000.00 each occurrence $4,000,000.00 aggregate (Same limits as above) (Same limits as above)
Automobile Liability: Bodily Injury/Property Damage	$1,000,000.00 combined single limit $1,000,000.00 each occurrence
Umbrella or Excess Liability	$5,000,000.00 each occurrence/aggregate
All Risk Builders Risk against the perils of fire, lightening, windstorm, hurricane, hail, explosion, riot, civil commotion, smoke, aircraft, land vehicles, vandalism, malicious mischief, and all other perils in the amount one hundred percent (100%) of the value of the improvements including transit and materials stored off site. Additionally, this coverage shall provide protection to the full replacement value for boiler and machinery equipment up to installation, during testing, and until acceptance by Owner.	
Professional Liability for Construction Manager-At-Risk. In addition to the coverage and limits provided above, if these General Conditions are incorporated into the AIA Document A133™–2019 Standard Form of Agreement Between Owner and Construction Manager as Constructor *where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price*, the Construction Manager shall also provide Professional Liability Insurance covering negligent acts, errors and omissions in the performance of professional services during the pre-construction phase, with policy limits of not less than One Million Dollars ($1,000,000.00) per claim and Two Million Dollars ($2,000,000.00) in the aggregate.	

§ 11.1.2 The ~~Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.~~required insurance must be written by a company licensed to do business in Texas at the time the policy is issued. In addition, the company must be acceptable to the Owner.

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§ 11.1.3 ~~Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.~~The General Liability and Automobile policies so issued in the name of Contractor shall also name the Owner as additional insured. The coverage afforded to the additional insured under the policy or policies shall be primary insurance. It is the intent of the parties to this Agreement that the General Liability coverage (and associated Umbrella Coverage) required herein shall be primary to and shall seek no contribution from all insurance available to Owner, with Owner's insurance being excess, secondary and non-contributing. The Commercial General Liability coverage provided by Contractor shall be endorsed to provide such primary and non-contributing liability. If the additional insured has other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis.

§ 11.1.4 ~~**Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.~~If the insurance is written with stipulated amounts deductible under the terms of the policy, the Contractor shall pay the difference attributable to deductions in any payment made by the insurance carrier on claims paid by this insurance. If the Owner is damaged by the failure of the Contractor to maintain such insurance and to so notify the Owner then the Contractor shall bear all reasonable costs properly attributable thereto.

§ 11.1.5 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents. Nothing contained herein shall limit or waive Contractor's legal or contractual responsibilities to Owner or others.

§ 11.1.6 Contractor shall have its insurance carrier(s) furnish to Owner insurance certificates in form satisfactory to Owner specifying the types and amounts of coverage in effect, the expiration dates of each policy, and a statement that no insurance will be canceled or materially changed while the Work is in progress without thirty (30) calendar day's prior written notice to Owner. Contractor shall permit Owner to examine the insurance policies, or at Owner's option, Contractor shall furnish Owner with copies, certified by the carrier(s), of insurance policies required in Section 11.1.1. If Contractor neglects or refuses to provide any insurance required herein, or if any insurance is canceled, Owner may, but shall not be obligated to, procure such insurance and the provisions of Section 11.1.8 hereof shall apply.

§ 11.1.7 Contractor and its Subcontractors shall not commence the shipment of equipment or materials or commence the Work at the site until all of the insurance coverage required of Contractor and its Subcontractors are in force and the necessary certificates and statements pursuant to Section 11.1.6 hereof have been received by Owner and the Architect has issued a written notice to proceed.

§ 11.1.8 As an alternative and at Owner's option and expense, Owner may elect to furnish or to arrange for any part or all of the insurance required by Section 11.1 hereof. If Owner so elects, it shall notify, in writing, Contractor and issue a Change Order therefor, but no adjustment to the scheduled completion date or the Contract Sum shall be allowed.

§ 11.1.9 Workers' Compensation Insurance Coverage.

.1 Definitions:

.1.1 Certificate of coverage ("Certificate"). A copy of a certificate of insurance, a certificate of authority to self-insure issued by the division, or a coverage agreement (DWC Form-81, DWC Form-82, DWC Form-83, or DWC Form-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on the Project, for the duration of the Project.

.1.2 Duration of the Project. Includes the time from the beginning of the work on the Project until the Contractor's work on the Project has been completed and accepted by the Owner.

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.1.3 **Persons providing services on the Project ("subcontractor" in Texas Labor Code §406.096).** Includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person contracts directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the Project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a Project. "Services" does not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

.2 The Contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the Contractor providing services on the Project, for the duration of the Project.

.3 The Contractor must provide a certificate of coverage to the Owner prior to being awarded the contract.

.4 If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the Project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the Owner showing that coverage has been extended.

.5 The Contractor shall obtain from each person providing Services on a Project, and provide to the Owner:

.5.1 a certificate of coverage, prior to that person beginning work on the Project, so the Owner will have on file certificates of coverage showing coverage for all persons providing services on the Project; and

.5.2 no later than seven (7) days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

.6 The Contractor shall retain all required certificates of coverage for the duration of the Project and for one (1) year thereafter.

.7 The Contractor shall notify the Owner in writing by certified mail or personal delivery, within ten (10) days after the Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.

.8 The Contractor shall post on each Project site a notice, in the text, form and manner prescribed by the Texas Department of Insurance, Division of Workers' Compensation, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

.9 The Contractor shall contractually require each person with whom it contracts to provide services on a Project, to:

.9.1 provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the Project, for the duration of the Project;

.9.2 provide to the Contractor, prior to that person beginning work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project, for the duration of the Project;

.9.3 provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

.9.4 obtain from each other person with whom it contracts, and provide to the Contractor:

(a) a certificate of coverage, prior to the other person beginning work on the Project; and

(b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

.9.5 retain all required certificates of coverage on file for the duration of the Project and for one (1) year thereafter;

.9.6 notify the Owner in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and

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.9.7 contractually require each person with whom it contracts, to perform as required by Subparagraphs .9.1 - .9.7 with the certificates of coverage to be provided to the person for whom they are providing services.

.10 By signing this contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the Owner that all employees of the Contractor who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the Texas Department of Insurance, Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

.11 The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor which entitles the Owner to declare the contract void if the Contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the Owner. [28 TAC §110.110(c)(7)]

§ 11.1.10 The Owner and Contractor shall waive all rights against (1) each other and the Contractors, Subcontractors, agents and employees each of the other, and (2) the Architect and separate Contractors, if any, and their contractors, Subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by property insurance applicable to the Work. The foregoing waiver afforded the Architect, his agents and employees shall not extend to the liability imposed by Section 3.18.3. The Owner or the Contractor, as appropriate, shall require of the Architect, separate contractors, contractors and Subcontractors by appropriate agreements, written where legally required for validity, similar waivers, each in favor of all other parties enumerated in this Section 11.1.10.

§ 11.2 Owner's Insurance [Paragraph Deleted.]

~~**§ 11.2.1** The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.~~

~~**§ 11.2.2 Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.~~

~~**§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.~~

§ 11.3 Waivers of Subrogation [Paragraph Deleted.]

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~~§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.~~

~~§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance~~

~~The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.~~

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor is required, as a condition precedent to the execution of the Contract, to execute a PERFORMANCE BOND in the form required by TEXAS STATUTES, in an amount equal to ONE HUNDRED PERCENT (100%) of the Contract Sum.

§ 11.4.2 The Contractor is required, as a condition precedent to the execution of the Contract, to execute a PAYMENT BOND in the form required by TEXAS STATUTES, in an amount equal to ONE HUNDRED PERCENT (100%) of the Contract Sum as security for payment of all persons performing labor and furnishing materials in connection with this Contract. (Bonding Company is to furnish such forms). All bonds shall name the Owner as additional obligee.

§ 11.4.3 The Payment and Performance Bond shall meet requirements of Chapter 2253 of the Texas Governmental Code. All bonds shall be issued by a surety company licensed, listed and authorized to issue bonds in the State of Texas by the Texas Department of Insurance. The surety company may be required by the Owner to have a rating of not less than "B" in the latest edition of Best's Insurance Reports, Property-Casualty. The surety company shall provide, if requested, information on bonding capacity, other projects under coverage and shall provide proof to establish adequate financial capacity for this Project. Should the bond amount be in excess of ten percent (10%) of the surety company's capital and surplus, the surety company issuing the bond shall certify that the surety company has acquired reinsurance, in a form and amount acceptable to the Owner, to reinsure the portion of the risk that exceeds ten percent (10%) of the surety company's capital and surplus with one or more reinsurers who are duly authorized and admitted to do business in Texas and that amount reinsured by an reinsurer does not exceed ten percent (10%) of the reinsurer's capital and surplus.

§ 11.4.4 The Sureties shall promptly file a signed copy of the Contract, Performance Bond, and Payment Bond with the Owner in full compliance with Chapter 2253 of the Texas Governmental Code or, in the case of a Construction Manager, as required by Section 14.3.3 of the AIA Document A133-2019.

§ 11.4.5 All bonds will be reviewed by the Architect for compliance with the Contract Documents prior to execution of the contract. In the event that the Architect has any questions concerning the sufficiency of the bonds, the bonds will be referred to the Owner or the Owner's representative for review and decision.

§ 11.4.6 All bonds shall be originals. The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the Power-of-Attorney. The name, address, and telephone number of a contact person for the bonding company shall be provided.

§ 11.4.7 Upon the request in writing of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

§ 11.4.8 Bonds shall be signed by an agent resident in the State of Texas and the date of the bond shall be the date of execution of the contract. If at any time during the continuance of the contract, the surety of the Contractor's bonds becomes insufficient, Owner shall have the right to require additional and sufficient sureties which the Contractor shall furnish to the satisfaction of the Owner within ten (10) business days after notice to do so. In default thereof, the Contractor may be suspended, and all payment or money due to the Contractor withheld.

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§ 11.4.9 By inclusion of this Section 11.4.8 in the Contract Documents, the surety which issues the bonds is hereby notified that the Owner, the Architect, and their agents and employees do not represent and will not be responsible for the surety's interests during the course of the Work. To protect its interests, the surety shall have the right to attend pay estimate meetings, review Applications for Payment when requested in writing by them, comment upon and make recommendations regarding payments, and inspect the Work in the presence of the Contractor and the Architect. By providing the bonds for the Work, the surety shall and hereby waives any cause of action against the Owner, the Architect, their agents and employees, for any loss suffered by the surety by reason of overpayment of any amounts to the Contractor, unless such is a direct result of a fraudulent or grossly negligent act committed by such party.

§11.5 Adjustment and Settlement of Insured Loss [Paragraph Deleted.]

~~**§ 11.5.1** A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.~~

~~**§ 11.5.2** Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.~~

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§ 12.1.1 If a portion of the Work is covered prior to inspection, contrary to the Architect's request or to requirements specifically expressed in the Contract ~~Documents,~~ Documents or if any known deficiencies exist, it must, if requested ~~in writing~~ by the Architect, be uncovered by the Contractor for the Architect's examination and be replaced at the Contractor's sole expense without change in the Contract Time. If the uncovered work is determined by the Architect upon inspection to be deficient or not in accordance with the Contract Documents, the uncovered Work which is deficient or not in accordance with the Contract Documents shall be corrected and covered at the Contractor's sole expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense. If the a request inspection of the Work prior to covering or including a requirement for inspection in the Contract Documents is within the Architect's standard of care and the Architect has failed to timely make such request or include the requirement in the Contract Documents, the Architect shall reimburse the Owner for the actual costs of uncovering and recovering such Work and additional costs of correction, if any, caused by covering the Work prior to inspection.

...

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's ~~expense.~~expense and will be subject to offset by the Owner at Final Payment.

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§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Owner shall give such notice of the condition to the Contractor with reasonable promptness after discovery of the condition. The Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such ~~condition. The Owner shall give such notice promptly after discovery of the condition.~~ condition in its non-conforming state. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor ~~and to make a claim for breach of warranty.~~ based on a breach of the warranty contained in this Section 12.2.2.1 providing for correction of Work during the one-year period. If the Contractor fails to correct nonconforming Work within a reasonable time during ~~that~~ the period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

...

§ 12.2.2.3 The one-year period for correction of Work shall ~~not~~ be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.2.4 Upon request by the Owner and prior to the expiration of one (1) year from the date of Substantial Completion, the Architect will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance.

...

§ 12.2.6 Contractor shall (i) re-execute any parts of the Work that fail to conform with the requirements of this Agreement that appear during the progress of the Work; (ii) remedy any defects in the Work due to faulty materials or workmanship which appear within a period of one (1) year from Substantial Completion of the Work hereunder, or within such longer period of time as may be set forth in the Drawings and Specifications or other Contract Documents; and (iii) replace, repair, or restore any parts of the Project or furniture, fixtures, equipment, or other items placed therein (whether by Owner or any other party) that are injured or damaged by any such parts of the Work that do not conform to the requirements of the Contract Documents or defects in the Work or by the negligent act of the Contractor or its employees, agents or subcontractors. The cost to Contractor of performing any of its obligations under this Section 12.2.6 to the extent not covered by insurance shall be borne by Contractor.

§ 12.2.7 The provisions of this Section 12.2 apply to Work done by Subcontractors of the Contractor as well as Work done directly by employees of the Contractor. The provisions of this Section 12.2.7 shall not apply to corrective Work attributable solely to the acts or omissions of any separate Contractor of Owner (unless Contractor is acting in such capacities). The cost to Contractor of performing any of its obligations under this Section 12.2.7 to the extent not covered by insurance shall be borne by Contractor.

§ 12.2.8 If, however, Owner and Contractor deem it inexpedient to require the correction of Work damaged or not done in accordance with the Contract Documents, an equitable deduction from the Contract Sum shall be made by written agreement between Contractor and Owner. Until such settlement, Owner may withhold such sums as Owner deems just and reasonable from moneys, if any, due Contractor. The settlement shall not be unreasonably delayed by the Owner and the amount of money withheld shall be based on estimated actual cost to the Owner of the correction.

§ 12.2.9 Contractor's express warranties set out in this Article 12 shall be in addition to, and not in lieu of, any other warranties or remedies Owner may have under the Contract Documents, at law, or in equity for defective Work.

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The Contract shall be governed by the ~~law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.~~ laws of the State of Texas without regard to choice-of-law rules of any

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jurisdiction. The Contract is deemed performable entirely in the County in which the Project is located. Any litigation to enforce or interpret any terms of the Contract, or any other litigation arising out of or as a result of the Contract, shall be brought in the State courts of said County. No provision of this Agreement shall waive any immunity or defense.

...

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. ~~Except as provided in Section 13.2.2, neither~~ Neither party to the Contract shall assign the Contract ~~as a whole~~ in whole or in part without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender or other entity providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.2.3 The invalidity of any part or provision of the Contract Documents shall not impair or affect in any manner whatsoever the validity, enforceability, or effect of the remainder of the Contact Documents.

...

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made at appropriate times as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public ~~authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals.~~ authorities having jurisdiction. Except for tests, inspections and approvals required to be provided by the Contractor in the Contract Documents, the Owner will contract for, independently of the Contractor, the inspection services, the testing of construction materials engineering, and the verification testing services necessary for the acceptance of the Work by the Owner. The Contractor shall give timely notice to the persons or entities selected by the Owner of the need for such services. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense. Architect, Owner and Contractor shall cooperate for the timely scheduling of such tests and inspections.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including but not limited to those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

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~~Payments~~ Undisputed payments due and unpaid under the Contract Documents shall bear interest ~~from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~ in accordance with the Texas Prompt Payment Act, Texas Gov't Code Chapter 2251. Any such payment shall be deemed overdue on the thirty-first (31st) day after Owner receives the Contractor's Certificate for Payment from the Architect, if Owner's Board of Trustees meets more than once per month. Any such payment shall be deemed overdue on the forty-sixth (46th) day after Owner receives the Contractor's Certificate for Payment from the Architect, if Owner's Board of Trustees meets once a month or less frequently. No

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interest shall be due on sums properly retained by Owner, except as provided by law, or on disputed sums unpaid by Owner.

§ 13.6 Equal Opportunity In Employment

§ 13.6.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, age, disability, sex, national origin, or any class otherwise protected by the Owner's policy or law. The Contractor agrees to post in conspicuous places, available to employees and applicants, notices setting forth the Contractor's nondiscrimination policies.

§ 13.6.2 The Contractor and the Contractor's Subcontractors shall, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, age, disability, sex, national origin, or any class otherwise protected by the Owner's policy or law.

§ 13.7 Contractors Records

§ 13.7.1 Contractor agrees to furnish Owner such information as may be available in Contractor's files and records for the Project for the purpose of aiding Owner in establishing a depreciation schedule for the Project or such portions thereof as Owner may determine.

§ 13.7.2 Contractor shall at all times through the date of Final Completion, maintain Job Records, including, but not limited to, invoices, payment records, payroll record, daily reports, diaries, logs, instructions, drawings, receipts, contracts, purchase orders, vouchers, memoranda, other financial data and job meeting minutes applicable to the Project, in a manner which maintains the integrity of the documents. Job Records must be retained by Contractor for at least twelve (12) years after the date of Final Completion of the Project. Within ten (10) days of Owner's request, Contractor shall make such Job Records available for inspection, copying and auditing by the Owner, Architect or their respective representatives, at Owner's central office or the principal offices of the Contractor, at the sole option of the Owner.

§ 13.7.3 For all Change Orders, Allowances and expenditures from Contingency Funds, Contractor shall also maintain, in accordance with the provisions of Section 13.9.1, the following: contract files, including proposals of successful and unsuccessful bidders, bid recaps and contractor payments; original estimates; estimating Work sheets; general ledger entries detail cash and trade discounts received; insurance rebates and dividends; and any other supporting evidence deemed necessary by the Owner to substantiate charges related to the Contract.

§ 13.7.4 Contractor shall keep a full and detailed financial accounting system and shall exercise such controls as may be necessary for proper financial management under this Contract; the accounting and control system shall be satisfactory to the Owner and shall be subject to the provisions of Section 13.7.1.

§ 13.7.5 Contractor shall keep all Construction Documents related to the Project, provided, however, Contractor shall not destroy said documents until Contractor has confirmed with Owner in writing that Owner has obtained a copy of all as-built drawings.

§ 13.7.6 In the event that an audit by the Owner reveals any errors/overpayments by the Owner, then the Contractor shall refund to the Owner the full amount of such overpayment within thirty (30) days of such audit findings, or the Owner, as its option, reserves the right to deduct such amounts owed to the Owner from any payments due to the Contractor.

§ 13.8 No Third-Party Beneficiaries

There are no third-party beneficiaries to this agreement.

§ 13.9 Proprietary Interests And Confidential Information

§ 13.9.1 Neither Architect nor Contractor shall use the image or likeness of Owner's Project or Owner's official logo or emblem and any other trademark, service mark, or copyrighted or otherwise protected information of Owner, without Owner's prior written consent. Contractor and Architect shall not have any authority to advertise or claim that Owner endorses Architect or Contractor's services, without Owner's prior written consent.

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§ 13.9.2 Neither Architect nor Contractor shall disclose any confidential information of Owner which comes into the possession of Architect or Contractor at any time during the Project, including but not limited to: pending real estate purchases, exchange, lease, or value; information related to litigation; detailed layouts of the Owner's Facilities; the location and deployment of security devices; security access codes; student likenesses; student record information; employee information; or any other information deemed confidential by law.

§ 13.9.3 The parties acknowledge that, as a public entity in the State of Texas, Owner is subject to, and must comply with, the provisions of the Texas Public Information Act, Texas Government Code Section 552.001, *et seq.*, and the Texas Open Meetings Act, Texas Government Code, Section 551.001, *et seq.*

§ 13.10 The invalidity of any part or provision of the Contract Documents shall not impair or affect in any manner whatsoever the validity, enforceability or effect of the remainder of the Contract Documents.

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§ 14.1.1 ~~The Contractor may terminate the Contract if~~ If the Work is stopped for a period of ~~30~~ thirty (30) consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of ~~the Work, for any of the following reasons:~~the Work under direct or indirect contract with the Contractor for any of the reasons set forth below, the Contractor may terminate the Contract upon twenty (20) days written notice to Owner and Architect if the Work is not allowed to commence within such period. The sole grounds for termination under this Subsection 14.1.1 are as follows:

...

.3 Because ~~the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because~~ the Owner has not made payment ~~on a~~ of undisputed sums due on an approved Certificate for Payment within the time stated in the Contract Documents; or

.4 ~~The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.~~[Subsection Deleted.]

§ 14.1.2 ~~The Contractor may terminate the Contract if,~~ If through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is ~~less.~~less, the Contractor may terminate the Contract so long as Contractor has provided Owner and Architect with written notice of its intent to terminate in the event of additional delays of not less than twenty (20) days and has furnished written notice of termination to Owner and Architect no less than seven (7) days prior to the effective date of termination.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment ~~for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.~~ in an amount which would have been recoverable had the termination been for the Owner's convenience.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon ~~seven~~ ten (10) additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

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.2 fails to make payment to Subcontractors or suppliers for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;

...

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.4 fails to proceed continuously and diligently with the construction and completion of the Work; except as permitted under the Contract Documents;

.5 fails to furnish the Owner, upon written request, with assurances satisfactory to the Owner, evidencing the Contractor's ability to complete the Work in compliance with all the requirements of the Contract Documents;

.6 engages in or permits serious or repeated worker misconduct in violation of Article 3.3;

.7 engages in conduct that would constitute a violation of state or federal criminal law, including but not limited to, the laws prohibiting certain gifts to public servants, or engages in conduct that would constitute a violation of the Owner's ethics or conflict of interest policies; or

.8 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, ~~and upon certification by the Architect that sufficient cause exists to justify such action,~~ subject to any prior rights of the surety, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

...

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. ~~Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.~~

In any such event, title to the Work and any products thereof, whether completed or partially completed, as well as all materials prepared, procured or set aside by the Contractor for use in the Work, shall vest in the Owner at the Owner's option, and the Owner may enter the Contractor's premises and remove the same therefrom. No election hereunder shall be construed as a waiver of any rights or remedies of the Owner with regard to any breach of the Contract Documents.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. Any further payment shall be limited to amounts actually earned to the date of termination.

§ 14.2.4 If the ~~unpaid balance of the Contract Sum exceeds~~ costs of finishing the Work, including compensation for the ~~Architect's~~ Architects' services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, ~~such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor~~ exceed the unpaid balance of the Contract Sum or Guaranteed Maximum Price (if the Project is a Construction Manager at Risk project), then the Contractor and/or its Surety shall pay the difference to the Owner. The amount to be paid to the ~~Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this~~ Owner shall be certified by Architect upon application. The obligation for payment shall survive termination of the Contract.

§ 14.2.5 The parties hereby agree that: 1) if an order for relief is entered on behalf of the Contractor, pursuant to Chapter 11 of the U.S. Bankruptcy Code; 2) if any other similar order is entered under any debtor relief laws; 3) if Contractor makes an assignment for the benefit of one or more of its creditors; 4) if a receiver is appointed for the benefit of its creditors; or 5) if a receiver is appointed on account of its insolvency, any such event could impair or frustrate Contractor's performance of the Contract Documents. Accordingly, it is agreed that upon occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions of the Contract Documents. Failure to comply with such request within ten (10) days of delivery of the request shall entitle Owner to terminate the Contract and to the accompanying rights set forth in Subparagraphs 14.2.1 through 14.2.6. In all events, pending receipt of adequate assurance of performance and actual performance in accordance with the Contract Documents, Owner shall be entitled to proceed with the Work with Owner's own forces or with other Contractors on a time and material or other appropriate basis, the cost of which will be charged against the Contract Sum.

§ 14.2.6 As required by Texas Government Code Chapter 2253, if a Performance Bond has been furnished and the Contractor is declared by the Owner to be in default under the Contract, then the Surety shall promptly perform the Work, in full accordance with the plans, specifications and Contract Documents. Unless otherwise agreed in writing between the Surety and the Owner, the Surety shall complete the Work by the Surety entering into a Contract

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acceptable to Owner, with a Contractor acceptable to Owner, and shall obtain new Payment and Performance Bonds as required by law.

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§ 14.3.2 The Contract Sum and Contract Time ~~shall~~ may be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. ~~Adjustment of the Contract Sum shall include profit.~~ No adjustment shall be made to the extent

...

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. Furthermore, if this Contract is a multi-year contract funded through Owner's current general funds that are not bond funds, then the Owner's Board of Trustees has the right to not appropriate adequate monies for the next fiscal year and to terminate this Contract at the end of each fiscal year during the term of the Contract, without the Owner incurring any further liability to Contractor as a result of such termination.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor ~~shall~~shall:

...

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly ~~executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.~~executed, for profit only on that portion of the Work executed, and reasonable costs of demobilization.

§ 14.4.4 Upon determination by a Court of competent jurisdiction that termination of the Contractor pursuant to Section 14.2 was wrongful, such termination will be deemed converted to a termination for convenience pursuant to Section 14.4, and Contractor's remedy for wrongful termination shall be limited to the recovery of the payments permitted for termination for convenience as set forth in this Section 14.4.3.

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§ 15.1.2 Time Limits on Claims

~~**The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.**~~[Paragraph Deleted.]

...

§ 15.1.3.1 Claims by ~~either~~ the ~~Owner or~~ Contractor, ~~where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2,~~ shall be initiated by notice to the ~~other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party~~ Owner and to the Architect, Claims under this Section 15.1.3.1 shall be initiated within 21 calendar days after the occurrence of the event giving rise to such Claim or within 21 calendar days after the claimant first ~~recognizes~~ knew or should have known of the condition giving rise to the Claim, whichever ~~is later.~~is earlier. If the full impact cannot be assessed as of the date of the Notice, then Notice shall be provided and amended by a second notice at the earliest date that is reasonably possible, but in no event later than the date of Contractor's Application for Payment covering the period in which the impact can be assessed and quantified.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required. If Texas Government Code, Chapter 2272 is applicable to the Claim, the Owner shall comply with the requirements set out therein as a condition precedent to any initiation of any litigation.

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...

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make undisputed payments for Work performed in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum (or Guaranteed Maximum Price, as applicable), if permitted, and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of ~~either party~~ the Contractor to proceed in accordance with this Article 15.~~The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.~~

...

If the Contractor wishes to make a Claim for an increase in the Contract ~~Sum,~~ Sum (provided such a claim is specifically permitted by the Contract Documents), notice as provided in Section 15.1.3 shall be given to the Owner and Architect. before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4. The Architect will promptly investigate such Claim and report findings and a recommended resolution in writing to the Owner and Contractor. If the Claim is approved by Owner, then Contractor shall proceed with the execution of the Work that is the subject matter of the Claim. If the Claim is rejected by the Owner, then Contractor may pursue alternative dispute resolution as provided for in the Contract Documents.

...

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions occurred at the locality of the Work which were abnormal for the period of time, were in excess of that normally experienced at the job site, could not have been reasonably anticipated, ~~and had an adverse effect on the scheduled construction.~~and prevented the execution of Work on scheduled Working Days. The term "Adverse Weather Conditions" as used herein means unusually severe weather which is beyond the normal weather recorded and expected for the locality of the Work and/or the season or seasons of the year. Normal weather conditions shall be determined based upon information compiled from the Local Climatological Data maintained by NOAA's National Centers for Environmental Information [formerly the National Climatic Data Center (NCDC)] from the station closest to the location of the Work. No day will be counted as a rain-day when substantial Contractor forces are able to perform Work on the Project for more than fifty percent (50%) of the usual workday or when the stage of the Work on the Project is not adversely impacted. The Contractor shall bear the entire economic risk of all weather delays and disruptions, and shall not be entitled to any increase in the Contract Price by reason of such delays or disruptions. Requests for an extension of the Contract Time pursuant to this Subparagraph shall be submitted to the Architect not later than the fifteenth (15th) day of the month following the month during which the delays or disruptions occurred, but shall be applied only to the extent that Substantial Completion of the Project exceeds the Substantial Completion date established for the Work. As provided herein, Contractor shall only be entitled an extension of the Contract Time per the terms of the Contract Documents and no damages shall be paid for delays.

~~**§ 15.1.7 Waiver of Claims for Consequential Damages**~~

~~The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes~~

~~.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and~~

~~.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.~~

~~This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.~~

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§ 15.1.7 Calculating Claims For Damages

Except as otherwise provided in this Agreement, in calculating the amount of any Claim recoverable by the Contractor, the following standards will apply:

.1 No indirect or consequential damages will be allowed.

.2 No recovery shall be based on a comparison of planned expenditures to total actual expenditures, or on estimated loss of labor efficiency, or on a comparison of planned manloading to actual manloading, or any other analysis that is used to show damages indirectly.

.3 Damages are limited to extra costs specifically shown to have been directly caused by a proven wrong.

.4 No damages will be allowed for home office overhead or other home office changes or any Eichleay formula calculation.

Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents, nor will this Section 15.1.7 be deemed to apply to delay damages, which are prohibited entirely.

§ 15.2.1 ~~Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision~~ Claims by the Contractor against the Owner, including those alleging an error or omission by the Architect but excluding those arising under Section 10.3, shall be referred initially to the Architect for consideration and recommendation to the Owner. An initial recommendation by the Architect shall be required as a condition precedent to mediation of any ~~Claim. If an initial decision has not been rendered within 30 days~~ Claim, after the Claim has been referred to the ~~Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.~~Architect with no recommendation having been rendered by the Architect.

§ 15.2.2 The ~~Initial Decision Maker~~ Architect will review Claims and within ten (10) days of ~~the~~ receipt of ~~a~~ the Claim take one or more of the following actions: (1) request additional supporting data from the ~~claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.~~Contractor; (2) issue an initial recommendation; (3) suggest a compromise; or (4) advise the parties that the Architect is unable to issue an initial recommendation due to a lack of sufficient information or conflict of interest.

§ 15.2.3 ~~In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.~~Following receipt of the Architect's initial recommendation regarding a claim, the Owner and Contractor shall attempt to reach agreement as to any adjustment to the Contract Price and/or Contract Time. If no agreement can be reached either party may request mediation of the dispute pursuant to Article 15.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. ~~Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.~~

§ 15.2.5 ~~The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.~~[Paragraph Deleted.]

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§ 15.2.6 ~~Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.~~[Paragraph Deleted.]

§ 15.2.6.1 ~~Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.~~[Paragraph Deleted.]

§ 15.2.8 ~~If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.~~**Waiver Of Lien**
It is distinctly understood that by virtue of this Contract, no mechanic, contractor, materialman, artisan, or laborer, whether skilled or unskilled, shall ever in any manner have, claim, or acquire any lien upon the building, or any of the improvements of whatever nature or kind so erected or to be erected by virtue of this Contract nor upon any of the land upon which said building or any of the improvements are so erected, built, or situated.

...

§ 15.3.1 ~~Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.~~In the event that the Owner or the Contractor shall contend that the other has committed a material breach of this Agreement, the party alleging such breach shall, as a condition precedent to filing any lawsuit, request mediation of the dispute. Mediation shall be subject to and in accordance with Chapter 154 of the Texas Civil Practice & Remedies Code. Mediation shall be conducted by a mutually-agreed-upon mediator qualified as an impartial third party for purposes of Section 154.052 of the Texas Civil Practice & Remedies Code.

§ 15.3.2 ~~The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.~~Request for mediation shall be in writing, and shall request that the mediation commence not less than thirty (30) or more than ninety (90) days following the date of the request, except upon agreement of both parties.

§ 15.3.3 ~~Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.~~In the event the Owner and the Contractor are unable to agree to a date for the mediation or to the identity of the mediator or mediators within thirty (30) days following the date of the request for mediation, all conditions precedent in this article shall be deemed to have occurred.

...

§ 15.3.5 Nothing herein shall preclude the Owner or the Contractor or as applicable, the Construction Manager from requesting that the Architect or one or more subcontractors be joined as parties to the mediation, to the extent allowed by their respective contracts.

§ 15.3.6 Any claim not resolved in mediation pursuant to Section 15.3 shall be subject to litigation as the sole method of dispute resolution.

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§ 15.3.7 Unless otherwise agreed in writing by the Owner in the Owner's sole discretion, the Contractor may not bring a legal action against the Owner unless:

.1 the Contractor has given written notice to the Owner of the Claim, dispute, or other matter giving rise to the legal action within ninety-one (91) days after the date of the start of the event giving rise to the Contractor's Claim, dispute or other matter, and

.2 the legal action is brought within two (2) years and one (1) day after the date of the start of the event giving rise to Contractor's Claim, dispute or other matter.

§ 15.4 **Arbitration. This Section 15.4 and all subparts are intentionally deleted.** No dispute arising under the Contract Documents, these General Conditions or the underlying Contract shall be subject under any circumstances to Arbitration as the method of binding dispute resolution and Owner rejects any selection otherwise made by the parties.

§ 15.5 Immunity

Contractor stipulates that Owner is a political subdivision of the State of Texas and, as such, may enjoy immunities from suit and liability under the Constitution and laws of the State of Texas. By entering into this Agreement, Owner does not waive any of its immunities from suit and/or liability, except as otherwise specifically provided herein and as specifically provided by law.

This Agreement entered into as of the _____ day of _____, 2025.

CALALLEN INDEPENDENT SCHOOL DISTRICT **EXHIBIT TO BID PACKAGE ONLY – NOT FOR SIGNATURE AT THIS TIME**		**COMPANY:** _____ **EXHIBIT TO BID PACKAGE ONLY – NOT FOR SIGNATURE AT THIS TIME**
OWNER *(Signature)*		**CONTRACTOR** *(Signature)*
Emily Lorenz Superintendent of Schools Email: elorenz@calallen.org		Name: _____ Title: _____ Email: _____
(Printed name and title)		*(Printed name and title)*

~~**§ 15.4.1** If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.~~

~~**§ 15.4.1.1** A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.~~

~~**§ 15.4.2** The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.~~

~~**§ 15.4.3** The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~

~~**§ 15.4.4 Consolidation or Joinder**~~

~~**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to~~

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User Notes: CLOUD TEMPLATE 08-18-17 (1349075300)

~~be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).~~

~~**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.~~

~~**§ 15.4.4.3** The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.~~

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Certification of Document's Authenticity

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I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 13:40:44 on 09/12/2025 under Order No. 20250116623 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2017, General Conditions of the Contract for Construction, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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(1349075300)

EXHIBIT C

To AIA® Document A101® – 2017
Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, as Modified By Owner

PROJECT: Calallen Independent School District: Calallen High School Stadium Improvements Project (2024 Bond) located at Phil Danaher Stadium 4001 Wildcat Drive, Corpus Christi, Texas 78410
OWNER: Calallen Independent School District
ARCHITECT: Rawley McCoy and Associates, PLLC
CONTRACTOR: _____

PREVAILING WAGE RATE SCHEDULE

CALALLEN ISD
PREVAILING WAGE RATE SCHEDULE (as of March 14, 2025)

Please note that fringes are only required to be paid on projects that involve federal funds. If you are unsure about whether the project will be using federal funds, please inquire and seek clarification.

General Decision Number: TX20250288 03/14/2025

Superseded General Decision Number: TX20240288

State: Texas

Construction Type: Building

Counties: Aransas, Nueces and San Patricio Counties in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least $17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.
If the contract was awarded on	Executive Order 13658

or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	generally applies to the contract. The contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2025
1	03/14/2025

* BOIL0074-003 01/01/2025

	Rates	Fringes
BOILERMAKER	$ 33.17	24.92

ELEC0278-002 08/25/2024

	Rates	Fringes
ELECTRICIAN	$ 30.80	8.97

ENGI0178-005 06/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
(1) Tower Crane	$ 32.85	13.10
(2) Cranes with Pile Driving or Caisson Attachment and Hydraulic Crane 60 tons and above	$ 28.75	10.60
(3) Hydraulic cranes 59 Tons and under	$ 32.35	13.10

IRON0084-011 06/01/2024

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 28.26	8.13

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* SUTX2014-068 07/21/2014

	Rates	Fringes
BRICKLAYER.	$ 20.04	0.00
CARPENTER.	$ 15.21 **	0.00
CEMENT MASON/CONCRETE FINISHER.	$ 15.33 **	0.00
INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation)	$ 19.77	7.13
IRONWORKER, REINFORCING.	$ 12.27 **	0.00
IRONWORKER, STRUCTURAL	$ 22.16	5.26
LABORER: Common or General…	$ 9.68 **	0.00
LABORER: Mason Tender - Brick.	$ 11.36 **	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.58 **	0.00
LABORER: Pipelayer.....	$ 12.49 **	2.13
LABORER: Roof Tearoff.....	$ 11.28 **	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.25 **	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93 **	0.00
OPERATOR: Bulldozer	$ 18.29	1.31
OPERATOR: Drill	$ 16.22 **	0.34
OPERATOR: Forklift	$ 14.83 **	0.00
OPERATOR: Grader/Blade	$ 13.37 **	0.00
OPERATOR: Loader	$ 13.55 **	0.94
OPERATOR: Mechanic	$ 17.52 **	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03 **	0.00
OPERATOR: Roller	$ 12.70 **	0.00

PAINTER (Brush, Roller, and Spray)..... $ 14.45 ** 0.00

PIPEFITTER.....$ 25.80 8.55

PLUMBER.....$ 25.64 8.16

ROOFER….....$ 13.75 ** 0.00

SHEET METAL WORKER (HVAC Duct Installation Only) .....$ 22.73 7.52

SHEET METAL WORKER, Excludes HVAC Duct Installation.....$ 21.13 6.53

TILE FINISHER.....$ 11.22 ** 0.00

TILE SETTER.....$ 14.74 ** 0.00

TRUCK DRIVER: Dump Truck.....$ 12.39 ** 1.18

TRUCK DRIVER: Flatbed Truck.....$ 19.65 8.57

TRUCK DRIVER: Semi-Trailer Truck.....$ 12.50 ** 0.00

TRUCK DRIVER: Water Truck….....$ 12.00 ** 4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($17.75) or 13658 ($13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination.

The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:
   a) a survey underlying a wage determination
   b) an existing published wage determination
   c) an initial WHD letter setting forth a position on a wage determination matter
   d) an initial conformance (additional classification
      a. and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION

SECTION 01 11 00 – SUMMARY OF WORK

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

A. THE PROJECT: Consists of additions and interior renovations at the High School Stadium, located in Corpus Christi, Texas for the Calallen Independent School District.

B. PROJECT COMPONENTS:
   1. The project components consist of five parts.
      a. PART ONE – AREA A: Addition and Interior Renovations to the existing North West restrooms of the High School Stadium. Structure is load bearing concrete block walls, wood framed roof deck and a single ply TPO roof system with a structural slab on select fill.
      b. PART TWO – AREA B: Addition and Interior Renovations to the existing South West restrooms of the High School Stadium. Structure is load bearing concrete block walls, wood framed roof deck and a single ply TPO roof system with a structural slab on select fill.
      c. PART THREE – AREA C: Addition and Interior Renovations to the existing North East restrooms of the High School Stadium. Structure is load bearing concrete block walls, wood framed roof deck and a single ply TPO roof system with a structural slab on select fill.
      d. PART FOUR – AREA D: Addition and Interior Renovations to the existing South East restrooms of the High School Stadium. Structure is load bearing concrete block walls, wood framed roof deck and a single ply TPO roof system with a structural slab on select fill.
      e. PART FIVE – AREA E: Demolition of existing home side stadium press box and structure. Construction of New Press Box and Elevator Tower. Elevator structure is load bearing concrete block walls, masonry and metal panel veneer, steel roof deck and a single ply TPO roof system with a structural slab on select fill. Press Box structure is structural steel, concrete floor deck, metal stud walls with metal panel veneer, steel roof deck and a single ply TPO roof system with structure supported by steel columns on concrete piers.

   2. Overall Stadium Site improvements include new parking, service drives, sidewalks,ornamental fencing, gates and all associated utilities. Additional work to include interior and exterior lighting and exterior painting of existing Home and Visitor Concession buildings and Booster building.

C. THE WORK:
   1. All work or portions of work necessary to provide a complete in-place, weathertight, structural sound facilities as represented in the Drawings and Specifications, including, but not limited to civil sitework and utilities, architectural and structural building components, architectural finishes, equipment, mechanical equipment and ducting, plumbing piping and fixtures, electrical equipment and fixtures, fire alarm, security and communications.

1.2 CONTRACT DESCRIPTION

A. Perform Work of Contract under separate contract with Owner in accordance with the Conditions of the Contract, and as modified by Supplementary Conditions of the Contract.

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1.3 CONTRACTS AND USE OF SITE

A. Contractor Use of Premises:
   1. Confine operations at site to areas permitted by:
      a. Law
      b. Ordinances
      c. Permits
      d. Contract Documents
   2. Do not unreasonably encumber site with materials or equipment.
   3. Assume full responsibility for protection and safekeeping of products stored on premises.
   4. Obtain and pay for use of additional storage or work areas as needed for operations.
   5. Contractor shall establish secured staging area for work and coordinate and provide for safe passage and exit from building areas during construction, as determined by City and District officials.
   6. Contractor shall coordinate all construction activities with Owner.
   7. Owner reserves the right to perform construction operations with its own forces or to employ separate contractors on portions of the Project. Contractor shall coordinate with this work in terms of providing site access, work space, and storage space, cooperation of work forces, scheduling, and technical requirements.
   8. Coordinate all utility shutdowns with Owner and, as required, with local utility companies, prior to commencement of shutdown.
   9. Periodically perform general clean up at project site as necessary to maintain aclean and safe working environment for the workers and site visitors. Provide litter barrels around site to dispose of litter and other small garbage items and remove large debris and trash from site as required. The Owner and/or Architect shall notify the Contractor if the site requires attention at no cost if the clean up efforts are not completed at reasonable intervals.

B. Owner Occupancy:
   1. Partial Owner Occupancy: The Owner reserves the right to place and install equipment in completed areas of the building, prior to Substantial Completion provided that such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
   2. A Certificate of Substantial Completion will be executed in accordance with conditions of the Contract.
   3. Contractor shall obtain a Certificate of Occupancy from local building officials prior to Owner occupancy.
   4. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy the Owner will provide operation and maintenance of mechanical and electrical systems in occupied portions of the building.
   5. Prior to partial Owner occupancy, emergency and life safety systems shall be fully operational. Emergency and life safety systems include, but are not limited to, fire sprinkler systems, fire alarm systems, and emergency egress devices. For emergency exiting purposes, the path of travel shall be clearly delineated and functional. If required, temporary barricades shall separate on-going construction from occupied spaces as allowed by the governing agency holding jurisdiction over the Project. Required inspections and tests shall have been successfully completed. Upon occupancy the Owner will provide operation and maintenance of emergency and life safety systems in occupied portions of the building.

C. Owner-Furnished Items:

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1. The Owner may provide items to the Contractor for installation in accordance with manufacturer's recommendations and instructions.
2. The Owner will arrange and pay for delivery of Owner-furnished items in accordance with the Contractor's Construction Schedule, and will inspect deliveries for damage.
3. If Owner-furnished items are damaged, defective or missing, through no fault of the Contractor, the Owner will arrange for replacement.
4. The Contractor is responsible for designating the delivery dates of Owner-furnished items in the Contractor's Construction Schedule and for receiving, unloading and handling Owner-furnished items at the site. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to elements, and to repair or replace items damaged as a result of his operations.

D. Coordination with Owner's Forces or Owner's Contractors:
   1. Provide site access, space allocation, scheduling, scheduling coordination, coordination of work forces and coordination of technical requirements with contractors that may be selected and employed by Owner to perform work simultaneously and in conjunction with the Work, which may include, but shall not be limited to the following, as applicable to the Project:
      a. Materials Inspection and Testing Agency
      b. HVAC Testing, Adjusting, Balancing Agency
      c. Energy Management System Contractor
      d. Data and Cabling System Contractor
      e. Telephone System Contractor
      f. Modular Furniture Installer
      g. Lighting and Sound
      h. Surveying
      i. Geotechnical Engineering and Consulting

E. The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage but only to the extent the Owner would be responsible for any such losses or damages under state and/or federal law.

F. The Architect will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract, except as noted in the above paragraph.

1.4 PROJECT RECORD DOCUMENTS

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A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Architects/Engineers written responses to Minor Change directives, Change Proposal Requests, and other supplemental instructions.
   5. Change Orders and other modifications to the Contract.
   6. Reviewed Shop Drawings, Product Data, and Samples.
   7. Manufacturer's instruction for assembly, installation, and adjusting.

B. Refer to section 01 78 39, Record Documents, As-Built Drawings for additional information.

1.5 PROTECTION OF EXISTING PROPERTY

A. Contractor shall provide and maintain adequate protection of all Owners' existing property during duration of Project.

B. Contractor shall verify location of all existing underground utilities on site with the owner of such utilities and authorities having jurisdiction and shall provide and maintain adequate protection of all such utilities during duration of Project.

C. Protection of Trees (designated to remain):
   1. Provide wood barricades around trees and shrubs at their drip line in traffic areas to protect them from construction operations until Substantial Completion, or until barricade removal is directed by Architect.

1.6 USE OF ASBESTOS FREE MATERIALS, PRODUCTS AND SYSTEMS

A. The Contractor is reminded to refer to the specification requirements regarding asbestos containing materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Refer to Specification Sections.

PART 3 - EXECUTION

3.1 CONSTRUCTION SCHEDULE

A. The Work shall commence on Notice to Proceed and the duration of Work shall based on the estimated schedule provided by the Contractor

B. Refer to the Standard Form of Agreement between Owner and Contractor and the General Conditions of the Contract for information concerning liquidated damages.

END OF SECTION 01 11 00

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SECTION 01 21 00 - ALLOWANCES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements governing handling and processing allowances.

1. Selected materials and equipment, and in some cases, their installation are shown and specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. Additional requirements, if necessary, will be issued by Change Order.

B. Types of allowances required include the following:

1. Lump sum allowances.
2. Contingency allowance.
3. Inspection and testing allowances.

C. Allowance amounts shall be transferable to other allowances as directed by the Architect.

1.2 SELECTION AND PURCHASE

A. At the earliest feasible date after Contract award, advise the Architect of the date when the final selection and purchase of each product or system described by an allowance must be completed in order to avoid delay in performance of the Work.

1. When requested by the Architect, obtain proposals for each allowance for use in making final selections; include recommendations that are relevant to performance of the Work.
2. Purchase products and systems as selected by the Architect from the designated service organization or supplier.

1.3 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to indicate actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.4 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed for the Owner's purposes, and only by Contingency Fund Change Orders which designate amounts to be charged to the allowance.

1. The Contractor's related costs for products or equipment ordered by the Owner under the contingency allowance, including delivery, installation, taxes, insurance, equipment rental, and similar costs are not part of the Contract Sum.
2. Change Orders authorizing use of funds from the contingency allowance will not include the Contractor's related costs and reasonable overhead and profit margins.

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Contractor shall include in base bid, Contractor's overhead, profit, insurance, bond and other direct cost.

3. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order or transfer the remaining amounts to other allowances as directed by the Architect.

1.5 INSPECTION AND TESTING ALLOWANCES

A. Inspection and testing allowances include the cost of engaging the inspection or testing agencies and costs for reporting the results as well as costs for the actual inspections and tests.

B. The allowance does not include incidental labor required to assist the testing agency, or costs for retesting upon failure of previous tests and inspections. The allowance also does not include costs of services not required by the Contract Documents.

1. At Project closeout, credit unused amounts remaining in the inspection and testing allowance to Owner by Change Order.

1.6 UNUSED MATERIALS

A. Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.

B. Where it is not economically feasible to return unused material for credit and when requested by the Architect, prepare unused material for the Owner's storage, and deliver to the Owner's storage space as directed. Otherwise, disposal of excess material is the Contractor's responsibility.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect products covered by an allowance promptly upon delivery for damage or defects.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related construction activities.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1 – Owner Contingency: Include a contingency allowance of One Hundred, Seventy-Five Thousand Dollars (**$150,000.00)** in the Base Proposal for general contingencies. This Allowance shall be for use upon the Owner's written instructions.

END OF SECTION 01 21 00

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SECTION 01 25 00 - SUBSTITUTION PROCEDURES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

A. RELATED DOCUMENTS
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

B. SUMMARY
   1. Section includes administrative and procedural requirements for substitutions.
   2. Related Sections:
      a. Division 01 Section "Allowances" for products selected under an allowance.
      b. Division 01 Section "Alternates" for products selected under an alternate.
      c. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
      d. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

C. DEFINITIONS
   1. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
      a. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
      b. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

D. SUBMITTALS
   1. Substitution Requests: Submit copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
      a. Substitution Request Form
      b. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
         1. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
         2. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
         3. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
         4. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
         5. Samples, where applicable or requested.

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6. Certificates and qualification data, where applicable or requested.
7. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
8. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
9. Research reports evidencing compliance with building code in effect for Project
10. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
11. Cost information, including a proposal of change, if any, in the Contract Sum.
12. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
13. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

c. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
    1. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
    2. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

E. QUALITY ASSURANCE
1. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

F. PROCEDURES
1. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

A. SUBSTITUTIONS
1. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than (15) days prior to time required for preparation and review of related submittals.
2. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

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b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

3. Substitutions for Convenience: Allowed
4. Substitutions for Convenience: Architect will consider requests for substitution if received within sixty (60) days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
   a. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
      1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
      2. Requested substitution does not require extensive revisions to the Contract Documents.
      3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      4. Substitution request is fully documented and properly submitted.
      5. Requested substitution will not adversely affect Contractor's construction schedule.
      6. Requested substitution has received necessary approvals of authorities having jurisdiction.
      7. Requested substitution is compatible with other portions of the Work.
      8. Requested substitution has been coordinated with other portions of the Work.
      9. Requested substitution provides specified warranty.
      10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

END OF SECTION 01 25 00

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SUBSTITUTION REQUEST FORM **(Bidding/Negotiating Phase)**

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____

Address: _____ Phone: _____

Trade Name: _____ Model: _____

Installer: _____

Address: _____ Phone: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old
☐ Point-by-point comparative data attached

Reason for not providing specified item: _____

Similar Installation: _____

Project: _____ Address: _____

Architect: _____ Owner: _____

Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

_____

Savings to Owner for accepting substitution: _____ ($ _____)

Proposed substitution changes Contract Time: ☐ No ☐ Yes; explain _____

Supporting Data Attached: ☐Drawings ☐Product Data ☐ Samples ☐ Tests ☐ Reports ☐_____

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by:_____

Signed by:_____

Firm:_____

Address:_____

_____ Telephone:_____

Attachments:_____

A/E's REVIEW AND RECOMMENDATION

☐ Approve Substitution - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Approve Substitution as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Reject Substitution - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by:_____ Date:_____

OWNER'S REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures. Prepare Change Order.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures. Prepare Change Order.
☐ Substitution rejected - Use specified materials.

Signed by:_____ Date:_____

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Additional Comments:

☐Contractor ☐Subcontractor ☐Supplier ☐Manufacturer ☐A/E

END OF SECTION 01 25 01

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SECTION 01 29 00 – PAY APPLICATIONS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
   1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.
   2. Coordinate the Schedule of Values breakdown and format requirements with the Architect.

RELATED SECTIONS

A. Section 01 33 00 – Submittal Procedures

SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.
   1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
      a. Contractor's Construction Schedule.
      b. Application for Payment forms, including Continuation Sheets.
      c. List of subcontractors.
      d. Schedule of allowances.
      e. Schedule of alternates.
      f. List of products.
      g. List of principal suppliers and fabricators.
      h. Schedule of submittals.
   2. Submit the Schedule of Values to the Architect at the earliest possible date but no later than 14 days after date of Owner-Contractor Agreement.
   3. Sub-schedules: Where Work is separated into phases provide sub-schedules showing values correlated with each phase.

B. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one-line item for each Specification Section.
   1. Identification: Include the following Project identification on the Schedule of Values:
      a. Project name and location.
      b. Name of the Architect.
      c. Project number.
      d. Contractor's name and address.
      e. Date of submittal.
   2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
      a. Related Specification Section
      b. Description of Work.
      c. Name of subcontractor.
      d. Name of manufacturer or fabricator.
      e. Name of supplier.
      f. Change Orders (numbers) that affect value.
      g. Dollar value.
   3. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

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4. Provide a breakdown of the Contract Sum, per Project Phase and Area in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
5. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
   a. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.
7. Provide a separate line item in the Schedule of Values for all work indicated to be for Area A, and separate from Area D.
8. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
9. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
10. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.
11. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum. List each Change Order as a separate line item.

APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
   1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional submittal requirements.

B. Payment-Application Times: Each progress-payment date is indicated in the Agreement. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form for Applications for Payment.

D. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.
   1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
   2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to the Architect by a method ensuring receipt within 24 hours. One copy shall be complete, including waivers of lien and similar attachments.

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1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.

F. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics lien from every entity who is lawfully entitled to file a mechanics lien arising out of the Contract and related to the Work covered by the payment.
   1. Submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
   2. Submit final Applications for Payment with or proceeded by final waivers from every entity involved with performance of the Work covered by the application that is lawfully entitled to a lien.
   3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
   4. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to the Owner.

G. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment, include the following:
   1. List of subcontractors.
   2. List of principal suppliers and fabricators.
   3. Schedule of Values.
   4. Contractor's Construction Schedule (preliminary if not final).
   5. Schedule of principal products.
   6. Schedule of unit prices.
   7. Submittal Schedule (preliminary if not final).
   8. List of Contractor's staff assignments.
   9. Copies of building permits.
   10. Copies of authorizations and licenses from governing authorities for performance of the Work.
   11. Initial progress report.
   12. Report of preconstruction meeting.
   13. Certificates of insurance and insurance policies.

H. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.
   1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
   2. Administrative actions and submittals that shall precede or coincide with this application include:
      a. Certificate of Occupancy and similar approvals.
      b. Warranties (guarantees) and maintenance agreements.
      c. Record Documents.
      d. Test/adjust/balance records.
      e. Maintenance instructions.
      f. Meter readings.
      g. Startup performance reports.
      h. Changeover information related to Owner's occupancy, use, operation, and maintenance.
      i. Final cleaning.
      j. Advice on shifting insurance coverage’s.
      k. List of incomplete Work (punch list), recognized as exceptions to Architect's Certificate of Substantial Completion.

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I. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
   1. Completion of Project closeout requirements.
   2. Completion of items specified for completion after Substantial Completion.
   3. Ensure that unsettled claims will be settled.
   4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
   5. Transmittal of required Project construction records to the Owner.
   6. Proof that taxes, fees, and similar obligations were paid.
   7. Removal of temporary facilities and services.
   8. Removal of surplus materials, rubbish, and similar elements.
   9. Change of door locks to Owner's access.

END OF SECTION 01 29 00

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SECTION 01 30 00 – ADMINISTRATIVE REQUIREMENTS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

ADVERTISING

A. The Contractor or any Subcontractors shall not advertise or publish without the Owner's prior consent, the fact that the Owner has entered into this contract, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state or local government.

GRATUITIES

A. The Owner may, by written notice to the Contractor, cancel the Contract for Construction without liability to the Contractor if it is determined by the Owner that gratuities, in the form of entertainment, gifts, or anything of monetary value, were offered or given by the Contractor, or any agent, or representative of the Contractor, to any officer or employee of Calallen Independent School District with a view toward securing a contract or securing favorable treatment with respect to the awarding, amending, or making of any determinations with respect to the performing of such a contract. In the event the Contract for Construction is canceled by the Owner pursuant to this provision, Owner shall be entitled, in addition to any other rights and remedies, to recover.

PROHIBITION AGAINST PERSONAL INTEREST IN CONTRACTS

A. Local Government Code, Chapter 171.

1. Local public officials and employees of governmental entities must comply with all aspects of Chapter 171, Texas Local Government Code. Bidders are encouraged to familiarize themselves with these provisions so that they can avoid conflicts that might arise out of relationships with public officials and employees of governmental entities.

B. Local Government Code, Chapter 176.

1. Any Vendor who contracts or seeks to contract with the a local government entity must file with its proposal a "Conflict of Interest Questionnaire".

CRIMINAL HISTORY NOTIFICATION

A. Section 44.034 TEC, Notification of Criminal History of Contractor:

a. A person or business entity that enters into a contract with a school district (applies to colleges also) must give advance notice to the district, if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony.
b. A school district may terminate a contract with a person or business entity if the district determines that the person or business entity failed to give notice as required by Subsection (a) or misrepresented the conduct resulting in the conviction. The district must compensate the person or business entity for services performed before the termination of the contract.
c. This section does not apply to a publicly held corporation.

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CRIMINAL HISTORY BACKGROUND SEARCHES

A. Senate Bill 9:

   a. Senate Bill 9 directs school district contractors to obtain state and national criminal history background searches on their employees who will have a direct contact with students, and to receive those results through the Texas Department of Public Safety (DPS) criminal history clearinghouse.
   b. To contact DPS; e-mail FACT@txdps.state.tx.us or telephone (512) 424-2365.

CERTIFICATE OF INTERESTED PARTIES

A. Effective January 1, 2016, the Calallen Independent School District, must comply with the "Disclosure of Interest Parties", mandated by Texas HB 1295, as implemented by the Texas Ethics Commission. Briefly stated, all contracts requiring an action or vote by the governing body of the entity or agency before the contract may be signed (regardless of the dollar amount) or has a value of at least $1 million will require the on-line completion of Form 1295 "Certificate of Interested Parties", per Texas Government Code Statute 2252.908. Form 1295 is also required for any and all contract amendments, extensions or renewals. All business entities are required to complete and file electronically with the Texas Ethics Commission using the online filing application.

   Step 1: Business Entity completes Form 1295 in electronic format on the Texas Ethics Commission website.

   https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

   Step 2: Upon receipt of a completed Interested Parties Disclosure Form, Texas Ethics Commission issues a Certification of Filing to the Business Entity and the Business Entity download, print, sign and notarize Form 1295. The notarized Form 1295 must be signed by an authorized agent of the business entity.

   Step 3: At the time of submission to The Calallen Independent School District the Business Entity submit with their contract* (i.e.: bid, rfp, rfq, soq, etc.) the signed and notarized Form 1295, along with the Certification of Filing, to Calallen ISD. Upon receipt, Calallen ISD may proceed with the award and/or execution of the contract.

   Step 4: Not later than the 30th day after the date the contract has been signed by all parties, Region III must notify the Texas Ethics Commission (in electronic format) of the receipt of (1) Form 1295, and (2) the Certification of Filing.

   Step 5: Not later than the 7th business day after receipt of the above notice, Texas Ethics Commission makes the disclosure available to the public by posting the disclosure on its website.

   Please visit the State of Texas Ethics Commission website,

   https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm
   and https://www.ethics.state.tx.us/tec/1295-Info.htm for more information.

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SCHEDULING THE WORK

A. The work shall be carefully scheduled and executed in a manner that will cause the least possible interference with the Owner's operations and property. The existing Football Field and Track, not scheduled to be demolished, shall remain accessible and operational throughout the project.

B. Prior to beginning the actual work, the Architect, Contractor and Owner's representative will meet to discuss the final scheduling and coordination of the work.

RIGHT OF ENTRY

A. The Owner reserves the right of entry to the property at all times for inspection of the work.

B. The Owner may perform collateral work or have work under separate contracts performed on the property. Owner must coordinate work performed under separate contracts with the Contractor and must grant the Contractor time extensions to his contract if such additional work causes delays.

MAINTENANCE MANUALS

A. Furnish the Owner four (4) copies of maintenance recommendations for all work installed.

B. Maintenance recommendations shall be furnished in a form approved by the Architect and shall be neatly typewritten and bound.

MANUFACTURER'S DIRECTIONS

A. All manufactured articles, materials, appliances and equipment shall be applied, installed, connected, erected, used, cleaned, conditioned and placed in operation as directed by the representative manufacturers, insofar as these directions are applicable to this particular project and are not in conflict with superior requirements in the specifications.

ASBESTOS

A. The General Contractor shall provide certification from himself, all Subcontractors, vendors, suppliers, entities, etc. stating that materials and/or equipment used in the construction of the project do not contain asbestos in any form or concentration. **MSDS sheets on all materials used must be provided.**

PROTECTION OF PROPERTY & PERSONS

A. Protect existing walks, curbing, sidewalks, drives, parking lots, bleachers, football field, track, and lawn areas. All damage caused by the Contractor or any Subcontractors shall be made good at the expense of the Contractor.

B. Provide necessary barricades / fencing / covers to protect persons during the course of the work or during periods when no work is in progress but when conditions around the construction areas could pose a danger.

COMPLIANCE WITH LAW

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A. During performance of his work, Contractor shall comply with all Federal, State and City Laws and Regulations.

DEBRIS REMOVAL

A. Contractors shall remove all debris resulting from the work being performed to a suitable site for disposal, and shall dispose of same in a manner that does not violate any City, State or Federal Law or Regulation.

END OF SECTION 01 30 00

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SECTION 01 31 00 – PROJECT MEETINGS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. This Section specifies the General Contractor's administrative and procedural requirements for project meetings, including the following:
   1. Pre-construction conferences.
   2. Pre-installation conferences.
   3. Progress meetings.
   4. Coordination meetings.

RELATED REQUIREMENTS

A. Section 01 33 00 – Submittal Procedures: Submitting the Contractor's Construction Schedule.

B. Individual Specification Sections for pre-installation conference requirements.

PRE-CONSTRUCTION CONFERENCE

A. Schedule a Pre-Construction conference before starting construction, at a time convenient to the Owner and the Architect, and within the time frame established by the District for commencement of the Work. Hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

B. Attendees: Authorized representatives of the Owner, Architect, and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, and suppliers, and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress, including the following:
   1. Tentative construction schedule.
   2. Approved Product List.
   3. Critical work sequencing including phasing.
   4. Designation of responsible personnel.
   5. Procedures for processing field decisions and Change Orders.
   6. Procedures for processing Applications for Payment.
   7. Distribution of Contract Documents.
   8. Submittal of Shop Drawings, Product Data, and Samples.
   9. Preparation of Record Documents.
   10. Use of the premises.
   11. Parking availability.
   12. Office, work, and storage areas.
   13. Equipment deliveries and priorities.
   14. First aid.
   15. Security.
   16. Housekeeping.
   17. Working hours.

PRE-INSTALLATION CONFERENCES

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A. Conduct a Pre-installation Conference at the Project Site before each construction activity that requires coordination with other construction. Determine which activity will require Pre-installation Conference at project startup meeting.

B. Attendees: The installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates.
   1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for the following:
      a. Options.
      b. Related Change Orders.
      c. Shop Drawings, Product Data, and quality-control samples.
      d. Review of mockups.
      e. Possible conflicts.
      f. Time schedules.
      g. Weather limitations.
      h. Manufacturer's recommendations.
      i. Warranty requirements.
      j. Compatibility of materials.
      k. Acceptability of substrates.
      l. Temporary facilities.
      m. Space and access limitations.
      n. Governing regulations.
      o. Safety.
      p. Inspecting and testing requirements.
      q. Required performance results.
      r. Recording requirements.
      s. Protection.

C. Record significant discussions and agreements and disagreements of each conference, and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.

D. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

PROGRESS MEETINGS

A. Conduct progress meetings at the Project Site twice monthly. Notify the Owner and the Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request. Two days prior to progress meeting distribute printed agenda to all projected attendees.

B. Attendees: In addition to representatives of the Owner and the Architect, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

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C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
   1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
   2. Review the present and future needs of each entity present, including the following:
      a. Interface requirements.
      b. Time.
      c. Sequences.
      d. Status of submittals.
      e. Deliveries.
      f. Off-site fabrication problems.
      g. Access.
      h. Site utilization.
      i. Temporary facilities and services.
      j. Hours of work.
      k. Hazards and risks.
      l. Housekeeping.
      m. Quality and work standards.
      n. Change Orders.
      o. Documentation of information for payment requests.
      p. Modification of construction work schedule or activities required to accommodate Owner’s continued use and activities at the site.

D. Reporting: No later than 3 days after each meeting, distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

E. Schedule Updating: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

END OF SECTION 01 31 00

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SECTION 01 32 16 – CONSTRUCTION PROGRESS SCHEDULE

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.1 SUBMITTALS

A. Schedules:
   1. Preliminary Analysis: Within ten (10) days after receipt of Award of Contract, submit a preliminary construction schedule for review by Owner and Architect.
   2. Construction Schedule: Within fourteen (14) days after receipt of Notice to Proceed, submit one (1) reproducible and four (4) prints of the approved construction schedule.
   3. Updated Construction Schedule(s): Within 48 hours (2 working days) of request, provide Architect one (1) copy of revised construction schedule congruent with actual construction activity as scheduled. These updates are for the Architect to confirm construction activities are on schedule.
   4. Recovery Schedule: In the event of significant schedule slippage, as determined by the Architect, within 48 hours (2 working days) the Contractor shall provide a project recovery schedule indicating how the Work is to be completed to return to the original project schedule.

1.2 RELIANCE UPON SCHEDULE

A. The construction schedule as approved by the Architect will be an integral part of the contract and will establish conditions for various activities and phases of constructions.

1.3 CONSTRUCTION SCHEDULE

A. Diagram: Graphically show the order of all activities necessary to complete the work and the sequence in which each activity is to be accomplished. Indicate critical path.

B. In addition to project construction, activities shown on the diagram shall include but not necessarily be limited to:
   1. Project mobilization
   2. Submittals and approvals of shop drawings and samples
   3. Phasing of construction
   4. Procurement of equipment and critical materials
   5. Fabrication and installation of special material and equipment
   6. Final clean-up
   7. Final inspection and testing

C. The construction schedule shall be maintained and current at all times and shall be submitted with each Application for Payment.

D. Provide a current “three week look ahead” based on the overall project schedule at each project meeting.

1.4 CONSTRUCTION SCHEDULE LIMITATIONS

A. A. Work performed under this Contract shall be done in accordance with the following paragraphs:
   1. All work may proceed immediately upon Notice to Proceed and continue uninterrupted.

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2. Under the Base Proposal only, the successful Offeror will be 1) entitled to certain extensions of time and 2) subject to liquidated damages for work not completed beyond the agreed date which the Contractor shall require for Substantial Completion of the work included in this contract. Refer to Supplementary Conditions for additional requirements and liquidated damages.
3. Failure to complete and close-out project after substantial completion may result in liquidated damages. Refer to Supplementary Conditions for additional requirements and liquidated damages.
4. Certificate of Substantial Completion will be issued for any of the above mentioned areas of work which are complete prior to the completion of the entire project.
5. The Owner may at his discretion approve changes recommended by the successful Offeror to the above-mentioned schedule provided that the Owner’s use of newly completed areas are not disrupted.

PART 2 - PRODUCTS

A. Not Used

PART 3 - EXECUTION

A. Not Used

END OF SECTION 01 32 16

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SECTION 01 33 00 – SUBMITTAL PROCEDURES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 SUBMITTAL PROCEDURES

A. Transmit to the Architect/Engineer each item indicated in individual specification sections with approved form identifying:
   1. Date of submission and dates of any previous submissions.
   2. Project title and number
   3. Contract identification
   4. Names of Contractor, Supplier, Manufacturer
   5. Pertinent drawing sheet and detail number, and specification section number, as appropriate
   6. Deviations from Contract Documents.

B. Contractor shall be responsible for initial review prior to submittal to Architect/Engineer to verify adequacy and conformance to contract requirements. Lack of review by Contractor shall be grounds for rejection.

C. Apply Contractor's stamp, signed, to each item submitted, certifying that review and verification of products, field dimensions, adjacent construction work and coordination of information is in accordance with the requirements of the work and Contract Documents.

D. Transmit each item in accordance with approved schedule, and in such sequence as to cause no delay in the work or in the work of any other contractor. Allow minimum of ten (10) days for adequate Architect/Engineer/Owner review of each submittal. Time may vary according to scope and complexity of item under review. Allow adequate time in schedule for revisions and resubmittal as deemed necessary.

E. Submit one (1) print copy of the entire submittal package and electronic copy of the same to the Architect. Transmit the printed copy of consultant and engineering submittals directly to respective consultants with a transmittal and the electronic original to the Architect. The Architect and Consultant will make up the printed copy and return to the Contractor upon completion of review. It will be the Contractor's responsibility to scan and distribute the necessary quantity of copies of the reviewed submittal to all concerned parties.

F. Submit each item according to individual specification sections and identified by Division, Section, and individual submittal number. Maintain log according to each Division.

G. Revise and resubmit submittal as required; identify all changes made since previous submittal.
   1. Make any corrections or changes in the submittals required by the Architect/Engineer and resubmit until approved.
   2. Submit new submittal as required for initial submittal.

1.2 PROPOSED PRODUCTS LIST

A. Within 30 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.3 PRODUCT DATA

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A. Submit to Architect for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Submit the number of copies of product data and samples which the Contractor and his subcontractors need for their use PLUS two (2) additional sets for the Architect, one (1) additional set for the Owner and one (1) additional set for each of the Architect's consultants involved with the particular Section of Work.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project

1.4 MSDS SHEETS

A. The Texas Asbestos Health Protection Rules (Title 25. Health Services, Part I. Texas Department of Health Chapter 295 - Occupational Health, Subchapter C - Texas Asbestos Health Protection) were approved and became effective on October 20, 1992, and amended March 27, 2003. The Rules established the procedures and means to implement the provisions of Senate Bill 1341 and House Bill 79.

B. Pursuant to the above referenced Rules, submit MSDS Sheets showing that materials used in the Project, contain 1.0 percent or less asbestos. This requirement pertains to every material in every Section of the Specifications, as applicable to the Project, whether written therein, or not. Submit MSDS Sheets for materials, including, but not limited to the following, as applicable to the Project.
   1. Surfacing Materials:
      a. acoustical plaster;
      b. decorative plaster/stucco;
      c. textured paint/coating;
      d. spray applied insulation;
      e. blown-in insulation
      f. fire proofing insulation;
      g. joint compound; and
      h. spackling compounds
   2. Thermal System Insulation:
      a. taping compounds (thermal)
      b. HVAC duct insulation;
      c. boiler insulation;
      d. breaching insulation;
      e. pipe insulation; and
      f. thermal paper products
   3. Miscellaneous Material:
      a. cement wallboard/siding;
      b. asphalt/vinyl floor tile
      c. vinyl sheet flooring/vinyl wall coverings;
      d. floor backing;
      e. construction mastic;
      f. ceiling tiles/lay-in ceiling panels;
      g. packing materials;
      h. h. high temperature gaskets;
      i. laboratory hoods/table tops
      j. fire blankets/curtains;
      k. elevator equipment panels;
      l. elevator brake shoes;
      m. ductwork flexible fabric connections;

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n. cooling towers;
o. heating and electrical ducts;
p. electrical panel partitions;
q. electrical cloth/electrical wiring insulation;
r. chalkboards;
s. roofing shingles/tiles;
t. roofing felt;
u. base flashing;
v. fire doors;
w. caulking/putties;
x. adhesives/mastics; and
y. wallboard

1.5 SHOP DRAWINGS

A. Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Submit one (1) opaque print of the shop drawing for the Architect plus one (1) additional opaque print for each of the Architect's consultants involved in the particular Section of Work plus two (2) additional opaque prints for the Owner.

D. All dimensions indicated on the drawings are based on the specific models and manufacturers of products, equipment, fixtures and miscellaneous items specified. If the Contractor uses an approved product by another listed manufacturer which is different than the specific model and manufacturer listed in these specifications, then the Contractor shall be solely responsible for the coordination of any dimensional changes required, including structural, relocation of walls, equipment, fixtures, ceilings and miscellaneous items. When dimensional changes are required in these situations, the Contractor shall submit a proposed modification drawing to the Architect for approval prior to proceeding with the work. All causes and effects of the dimensional change shall be indicated on the Contractor's drawing submittal.

1.6 SAMPLES

A. Submit for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Submit for aesthetic, color, or finish selection. Submit full range of manufacture's standard colors, textures, and patterns for Architect's selection.

C. Submit samples to illustrate functional characteristics of the Product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.

D. Submit the number specified in respective Specification Section; minimum of two (2), of which one (1) will be retained by Architect.

E. Reviewed samples which may be used in the Work are indicated in individual specification sections.

F. Samples will not be used for testing purposes unless specifically stated in specification section.

1.7 DESIGN DATA

A. When required, submit for Architect/Engineer's knowledge as contract administrator or for Owner.

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B. Submit design data for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.8 TEST REPORTS

A. In accordance with Section 01 45 23, Testing and Inspecting Services, submit test reports for Architect/Engineer's knowledge as contract administrator or for Owner. Architect will determine whether corrective action is required.

B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect, in quantities specified.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect and Owner.

D. Submit required certificates in duplicate.

1.10 GUARANTEES

A. When specified in individual specification sections, submit warranties by manufacturer, installation/application subcontractor, fabricator, or Contractor to Architect, in quantities specified.

B. Submit warranties in accordance with Section 01 77 00, Closeout Procedures.

1.11 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect for delivery to Owner in quantities specified.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Submit required instructions in duplicate.

1.12 MANUFACTURER'S FIELD REPORTS

A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.

B. Submit report in quantity specified or required within ten (10) days of observation to Architect for information. Architect will determine whether corrective action is required.

C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.13 ERECTION DRAWINGS

A. When required, submit drawings for Architect/Engineer's benefit or for Owner.

B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

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C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner. Architect will determine whether corrective action is required.

1.14 COORDINATION DRAWINGS

A. Areas where multiple trades and disciplines have concurrent or sequenced work, the Contractor shall submit coordination drawings indicating coordination of the work among all trades to reduce conflicts. All coordination, review and approval shall be complete prior to the beginning of installation of any work in these areas. Failure to coordinate work in these areas shall be grounds for disapproval of any requests for change orders, substitution requests, alternate means to achieve desired result or schedule modifications. Areas include, but are not limited to, above ceilings in corridors, chase walls, and any other condition where sequencing and conflicts among trades may arise.

1.15 CONSTRUCTION PHOTOGRAPHS

A. Provide photographs monthly of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Architect/Engineer.

B. Photographs: digital; sent to Architect via email, or provide on non-rewritable compact disk. Along with Application for Payment, include one (1) reproducible copy of contact sheet of all photographs taken during that period indicating Work completed and identified as stated below.

C. Photograph project conditions five (5) days maximum prior to submitting indicating relative progress of the Work. Do not photograph conditions previously photographed if no work has proceeded. As able, take photographs from same position indicating same view in successive installments.

D. Take photographs as evidence of existing project conditions as follows:
   1. Site: Take four (4) site photographs at project corners
   2. Interior views: Take two (2) minimum interior photographs of each space under construction from differing directions or as required.
   3. Exterior views: Take two (2) photographs of each elevation.
   4. Details: Take as required to document concealed conditions, including, but not limited to, underground construction, utility penetrations and installation, steel erection, concrete and masonry reinforcing, waterproofing and flashing, and roofing installation.
   5. Cavity wall: Provide photographic evidence that cavity wall was maintained clean and free of debris and excess mortar.
   6. Photos of underground items, including but not limited to:
      a. Vapor barrier under slabs clearly showing proper penetration preparation
      b. Irrigation piping
      c. Valves
      d. Spray heads
      e. Grease interceptor
      f. Below grade dampproofing and waterproofing around building perimeter for suspended slab

E. Identify each photograph with name of Project, room or view, and date.

PART 2 - PRODUCTS

A. Not Used

PART 3 - EXECUTION

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A. Not Used

END OF SECTION 01 33 00

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SECTION 01 41 00 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections apply to work specified in this Section.

1.2 PROCEDURE

A. Testing Laboratory:

An independent testing laboratory will be selected and furnished by the Owner to inspect and test the materials and methods of construction as hereinafter specified for compliance with the specification requirements of the Contract Documents and to perform such other specialized technical services as required by the Owner or his representative. All testing lab services shall be paid for by the owner.

1.3 QUALIFICATIONS OF TESTING LABORATORY

A. The Testing Laboratory selected shall meet the basic requirements of ASTM E329 "Standard of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction", and shall submit to the Contractor, Owner, Architect, and Engineer, a copy of the report of inspection of their facilities made by the Materials Reference Laboratory of the National Bureau of Standards during the most recent tour of such inspections, and shall submit a memorandum stating steps taken to remedy all deficiencies reported by this inspection.

B. The Testing Laboratory selected shall meet "Recommended Requirements for Independent Laboratory Qualification", latest edition, as published by the American Council of Independent Laboratories.

C. The Testing Laboratory shall be approved by the local Building Official to perform inspection and certification services as an approved inspector of prefabricated construction.

D. Testing machines shall be calibrated at intervals not exceeding 12 months by devices of accuracy traceable to the National Bureau of Standards or accepted values of natural physical constants. The Testing Laboratory shall submit a copy of certificate of calibration made by an accredited calibration agency.

E. Tests and inspections shall be conducted in accordance with specified requirements, and if not specified, in accordance with the applicable standards of the American Society for Testing and Materials or other recognized and accepted authorities in the field.

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1.4 AUTHORITIES AND DUTIES OF THE LABORATORY

A. Attending Preconstruction Conferences:

The Testing Laboratory shall obtain and review the project plans and specifications with the Architect and Engineer as soon as possible prior to the start of construction. The Laboratory shall attend preconstruction conferences with the Architect, Engineer, Project Manager, General Contractor, and Material Suppliers as required to coordinate materials inspection and testing requirements with the planned construction schedule. The Laboratory will participate in such conferences throughout the course of the project.

B. Outline Testing Program:

The Testing Laboratory shall be responsible for outlining a written detailed testing program conforming to the requirements as specified in the Contract Documents and in consultation with the Owner, Contractor, Architect, and Engineer. The testing program shall contain an outline of inspections and tests to be performed with reference to applicable sections of the specifications or drawings and a list of personnel assigned to each portion of the work. Such testing program shall be submitted to the Owner, Contractor, Architect, and Engineer five weeks in advance of the start of construction so as not to delay the start of construction. It shall be the Testing Laboratory's responsibility that such program conforms to the requirements of the Specifications and drawings and falls within the budget for testing laboratory services. If the allocated budget is not sufficient to cover the services as outlined in the Specifications, it shall be the responsibility of the Laboratory to notify the Contractor, Architect, Engineer, and Owner so that the Laboratory services can be modified accordingly prior to the start of construction. Furthermore, the Testing Laboratory shall monitor its expenditures throughout the course of the job and notify immediately the Owner, Contractor, Architect, and Engineer, of any significant deviation from the planned testing program and budget.

C. Cost Proposal:

The Testing Laboratory's proposal to the Owner shall contain the outlined testing program based on a unit price basis for tests and inspections and on an hourly basis for personnel. A total estimated price shall also be submitted.

D. Cooperation with Design Team:

The Laboratory shall cooperate with the Architect, Engineer, and Contractor and provide qualified personnel promptly on notice.

E. The Laboratory shall perform the required inspections, sampling, and testing of materials as specified under each section and observe methods of construction for compliance with the requirements of the Contract Documents.

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F. Inspections Required by Government Agencies:

The Testing Laboratory shall perform all inspections and submit all reports and certifications as required by all government agencies.

G. Notification of Deficiencies in the Work:

The Laboratory shall notify the Architect, Engineer, and Contractor first by telephone and then in writing of observed irregularities and deficiencies of the work and other conditions not in compliance with the requirements of the Contract Documents.

H. Reports:

1. Information on Reports:

The Laboratory shall submit copies of all reports of inspections and tests promptly and directly to the parties named below. All reports shall contain at least the following information:

a. Project Name
b. Date report issued
c. Testing Laboratory name and address
d. Name and signature of inspector
e. Date of inspection and sampling
f. Date of test
g. Identification of product and Specification section
h. Location in the project
i. Identification of inspection or test
j. Record of weather conditions and temperature (if applicable)
k. Results of test regarding compliance with Contract Documents.

2. Copies:

The Laboratory shall send certified copies of test and inspection reports to the following parties:

a. 2 copies to the Owner or his representative
b. 2 copies to the General Contractor
c. 1 copy to the Architect
d. 1 copy to the Engineer of responsibility
e. 1 copy to the Supplier of the material tested

3. Certification by Notary Public:

Upon completion of the job, the Testing Laboratory shall furnish to the Owner, Architect, and Engineer of responsibility, a statement certified by a Notary Public that all required tests and inspections were made in accordance with the requirements of the Contract Documents.

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I. Accounting:

The Testing Laboratory shall be responsible for separating and billing costs attributed to the Owner and cost attributed to the Contractor.

J. Obtaining Product and Material Certifications:

The Testing Laboratory shall be responsible for obtaining all product and material certifications from manufacturers and suppliers as specified in the Specifications.

K. Limitations of Authority:

The Testing Laboratory is not authorized to revoke, alter, relax, enlarge upon, or release any requirements of the Specifications or to approve or accept any portion of the work or to perform any duties of the General Contractor and his Subcontractors.

1.5 CONTRACTORS RESPONSIBILITY

A. Cooperation with Design Team:

The owner shall pay for all testing lab services. The Contractor shall cooperate with laboratory personnel, provide access to the work, and to manufacturers operations.

B. Furnishing Samples:

The Contractor shall provide to the laboratory representative, samples of materials proposed for use in the work in quantities sufficient for accurate testing as specified.

C. Furnishing Casual Labor, Equipment and Facilities:

The Contractor shall furnish casual labor, equipment, and facilities as required for sampling and testing by the Laboratory and otherwise facilitate all required inspections and tests.

D. Advance Notice:

The Contractor shall be responsible for notifying the Testing Laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

E. Payment for Substitution Testing:

The Contractor shall arrange with the Testing Laboratory and pay for any additional samples and tests above those required by the Contract Documents as requested by the Contractor for his convenience in performing the work.

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F. Payment for Retesting:

The Contractor shall pay for any additional inspections, sampling, testing, and retesting as required when initial tests indicate work does not comply with the requirements of the Contract Documents.

G. Payment by Contractor:

The Contractor shall furnish and pay for the following items:

1. Soil survey of the locations of borrow soil materials, samples of existing soil materials, and delivery to the Testing Laboratory.

2. Samples of concrete aggregates and delivery to the Testing Laboratory.

3. Concrete mix designs as prepared by his concrete supplier or by his Testing Laboratory.

4. Concrete coring, tests of below strength concrete, and load tests, if ordered by the Owner, Architect, or Engineer.

5. Certification of reinforcing steel mill order.

6. Certification of structural steel mill order.

7. Certification of Portland cement, lime, and flyash.

8. Certification of welders.

9. Tests, samples and mock-ups of substitute material where the substitution is requested by the Contractor and the tests are necessary in the opinion of the Owner, Architect, or Engineer to establish equality with specified items.

10. Any other tests when such cost are required by the Contract Documents to be paid by the Contractor.

H. Notification of Source Change:

The Contractor shall be responsible for notifying the Owner, Architect, Engineer, and Testing Laboratory when the source of any material is changed after the original tests or inspections have been made.

I. Tests for Suspected Deficient Work:

If in the opinion of the Owner, Architect, or Engineer any of the work of the Contractor is not satisfactory, the Contractor shall make all tests that the Owner, Architect, or Engineer deem advisable to determine its proper construction. The owner shall pay all costs if the tests prove the questioned work to be satisfactory.

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1.6 PAYMENT OF TESTING LABORATORY

The Owner will pay for all Laboratory services for testing of materials for compliance with the requirements of the Contract Documents. The Contractor will pay for testing and retesting of materials that do not comply with the requirements of the Contract Documents and all other items as specified in these Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCOPE OF WORK

The work to be performed by the Testing Laboratory shall be as specified in this Section of the Specification and the contract drawings, and as determined in meetings with the Contractor, Owner, Architect, and Engineer.

3.2 PIER FOUNDATION:

1. Field Inspection:

   The Testing Laboratory shall provide inspection of all piers for the project.

2. Drilled Piers

   a. Concrete Cylinders: Make and test concrete cylinders as specified for Cast-in-Place Concrete.
   b. Bearing Elevation: Observe that piers are founded in proper bearing strata as defined in the Geotechnical Report and that bottom of hole is clean and properly formed.
   c. Bells: Verify that bells are to the correct diameter
   d. Concrete Quantities: Record quantity of concrete placed in each pier and compare against theoretical quantity required. Report discrepancies to Engineer.
   e. Placement Method: Observe that piers are placed by approved methods as defined in the Geotechnical Report. Confirm that casings are being used when needed as recommended in the Geotechnical Report. Confirm that concrete is not being contaminated by soil encroaching into pier.
   f. Reinforcing Steel: Inspect reinforcing steel for proper number and size of bars and confirm dowel or anchor bolt placement into top of pier.

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3.3 EARTHWORK

A. Tests of Proposed Fill Material:

The Testing Laboratory shall conduct a survey of the Contractor's proposed location of borrow soil materials and shall establish the suitability of any proposed fill material by determining the required engineering properties. Soil tests shall include soil classification by the Atterberg Limit Tests ASTM D4138, and grain size determined by ASTM D422 "Particle Size Analysis of Soils" unless noted otherwise in the geotechnical investigation reports.

B. Moisture Density Relationship for Natural and Fill Materials:

The Testing Laboratory shall provide one optimum moisture density curve for each type of soil, natural, imported fill, or on-site fill, encountered in subgrade and fills under building slabs and paved areas. Curves shall be generated in accordance with ASTM D1557 "Test Methods for Moisture Density Relationships of Soils and Soil Aggregate Mixtures" unless noted otherwise in the geotechnical investigation report.

C. Quality Control Testing Required During Construction:

1. Inspection of Subgrade and Fill:

The Owner's Testing Laboratory shall inspect and approve the following subgrades and fill layers before further construction work is performed thereon:

a. Paved Areas: Make at least one field density test of the natural subgrade for every 2500 square feet of paved area or slab but in no case less than three tests. In each compacted fill layer or lift, make one field density test for every 2500 square feet of slab or paved area but in no case less than three tests.

2. Field Density Tests:

Field Density Tests shall be run according to ASTM D1556 "Density of Soil in Place by the Sand Cone Method," ASTM D2167 "Density of Soil in Place by the Rubber Balloon Method" or ASTM D2922 "Density of Soil and Soil Aggregate in Place by Nuclear Methods" or ASTM D698 "Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort" as applicable unless noted otherwise in the geotechnical investigation reports.

3. Acceptance Criteria:

The result of field density tests by the Testing Laboratory will be considered satisfactory if the average of any three consecutive tests has a value not greater than 2 percent below the required density.

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4. Report Copies:

   The Testing Laboratory shall submit all moisture density curves and results of field density tests to the parties specified earlier in this section.

5. Additional Testing:

   If reports by the Testing Laboratory indicate field densities lower than specified above, additional tests will be run by the Testing Laboratory with at least the frequencies scheduled above on recompacted fill and/or natural subgrade. The Testing Laboratory shall notify the Contractor on a timely basis for any required retesting so as not to delay the work. The costs of such tests shall be borne by the Contractor.

3.4 REINFORCING STEEL

A. Visual Inspection:

The Testing Laboratory shall inspect the rebar to determine the following:

1. The bars shall be free from injurious defects and shall have a workman-like finish.

2. Deformations shall be of the proper sizes, shapes, and spacing as detailed in ASTM A-615.

3. The bars shall not have excessive rust and/or pelting.

4. The bars shall not have any unusual twists or bends.
5.

B. Identified Stock:

Where job material is taken from bundles as delivered from the mill, is properly identified as to heat number and is accompanied by mill and analysis test reports, provided an affidavit is given from the Supplier to the Testing Laboratory that the materials conform with the requirements of the ASTM specification as listed on the structural drawings. In case of controversy, the procedure as stipulated below for unidentified stock shall be followed.

C. Unidentified Stock:

For all unidentified stock, the Testing Laboratory shall secure samples of the reinforcing steel bars at the time of inspection. The samples shall confirm to the following:

1. The sample shall include 2 bars for each ten tons or fraction thereof, of each bar size, heat number, and manufacturer being shipped.

2. The sample bars shall be a minimum of 24 inches in length and should be identical to the material being shipped.

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The Testing Laboratory shall tag each of the steel bundles with the Laboratory identification tag and appropriately mark the samples corresponding to the steel being inspected and shipped. The fabricator will supply shipping lists showing the weight of each bar size in the shipment.

3.5 CONCRETE MATERIALS AND POURED IN PLACE CONCRETE

A. Tests of Portland Cement:

Portland Cement shall be tested by the Testing Laboratory for compliance with the requirements of ASTM C150.

1. Mill Certificates:

Mill certificates certifying that the cement has been tested and meets the requirements of the Specifications will be acceptable as test results, provided the cement proposed for use can be identified with test lots. Mill certificates shall be submitted by the Contractor prior to use of any such material.

2. Retesting:

Retesting of cement will be required if:

a. In the opinion of the Owner, Architect, or Engineer, the cement has been damaged in storage or transit or is any way defective.

b. The cement has been in storage at the mixing site for over 30 days.

B. Test of Aggregates:

1. The Contractor's Testing Laboratory shall verify that concrete aggregates proposed for use conform to the following specification:

a. ASTM C33 "Specification for Concrete Aggregates"

Suppliers record of tests run on the proposed materials will be adequate provided a written affidavit is furnished as a shop drawing submittal.

C. Concrete Mix Designs:

The Contractor shall submit for approval by the Engineer and Testing Laboratory at least 15 days prior to the start of construction, concrete mix designs for each class of concrete indicated on the structural drawings and in the Specifications. The Contractor shall not begin work until the applicable mix design has been approved.

1. The Contractor acting in conjunction with his Concrete Supplier and the Testing Laboratory shall submit in writing with his mix designs, whether

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the concrete is to be proportioned by either of the following methods as outlined in ACI 318:

a. Field Experience Method
b. Laboratory Trial Batch Method

When field experience methods are used to select concrete proportions, establish proportions as specified in ACI 301 and ACI 211. When Laboratory trial batches are used to select concrete proportions, the procedure as outlined in ACI 318 shall be followed. Prepare test specimens in accordance with ASTM C192 and conduct strength tests in accordance with ASTM C39.

2. Required types of concrete and compressive strengths shall be as indicated on the Structural Drawings and as specified in the various sections of the Specifications.

3. All mix designs shall state the following information:

a. Mix design number or code designation by which the Contractor shall order the concrete from the Supplier
b. Structural member for which the concrete is designed (i.e. columns, piers, etc.)
c. Type of concrete (normal weight).
d. 28 day compressive strength
e. Aggregate type, source, size, gradation, fineness modulus
f. Cement type and brand
g. Fly ash type and brand (if any)
h. Admixtures including air entrainment, water reducers, accelerators, and retarders
i. Slump
j. Proportions of each material used
k. Water cement ratio and maximum allowable water content
l. Method by which the concrete is intended to be placed (bucket, chute, or pump)

4. Concrete Suppliers Record of Quality Control:

The concrete supplier's past record of quality control shall be used in the design of the concrete mixes to determine the amount by which the average concrete strength fcr should exceed the specified strength f'c as outlined in ACI 318. If a suitable record of test results is not available, the average strength must exceed the design strength by 1200 PSI as specified in ACI 318. After sufficient data becomes available from the job, the statistical methods of ACI 214 may be used to reduce the amount by which the average strength must exceed f'c as outlined in ACI 318.

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5. Admixtures:

   a. Admixtures to be used in concrete shall be subject to the approval of the Engineer and Testing Laboratory.

   b. Quantities of admixtures to be used shall be in strict accordance with the manufacturers instructions.

   c. Admixtures containing chloride ions shall not be used in concrete containing galvanized or aluminum embedments.

   d. Air entraining admixtures shall conform to "Specification for Air Entraining Admixtures for Concrete" ASTM C260.

   e. Water reducing admixtures, retarding admixtures, accelerating admixtures, water reducing and retarding admixtures, and water reducing and accelerating admixtures shall conform to "Specification for Chemical Admixtures for Concrete" ASTM C494.

   f. Fly ash or other pozzolons, used as admixtures, shall conform to "Specification for Fly Ash and Raw or Calcined Natural Pozzolons for use in Portland Cement Concrete" ASTM C618. Obtain mill test reports for approval. Maximum flyash content shall be 20%.

   g. Use amounts of admixtures as recommended by the manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities of admixtures as required to maintain quality control.

6. Slump Limits:

   Unless shown otherwise on the structural drawings, proportion and design mixes to result in concrete slump at the point of placement as follows:

   a. Ramps and Sloping surfaces - 3" ± 1"
   b. Foundation concrete - 4-1/2" ± 1-1/2"
   c. All other concrete - 4" ± 1"

   When increased workability, pumpability, lower water-cement ratio, shrinkage reduction, or permeability reduction is required, then a superplasticizer admixture shall be considered for use. The maximum slump with the use of superplasticizers shall be 8 inches unless approved otherwise by the Architect/Engineer and Testing Laboratory.

   Any deviation from these values (such as concrete design to be pumped) shall be submitted to the Engineer and Testing Laboratory for approval.

7. Adjustments of Concrete Mixes:

   Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other

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circumstances warrant. Such mix design adjustments shall be provided at no additional cost to the Owner. Any adjustments in approved mix designs including changes in admixtures shall be submitted in writing to the Engineer and Testing Laboratory for approval prior to field use.

8. Shrinkage:

All concrete shall be proportioned for a maximum allowable unit shrinkage of 0.03% at 28 days as determined by ASTM C 157.

9. Chloride Ion Content:

A written submittal shall be made with each mix design proposed for use on the project that the chloride ion content from all ingredients including admixtures will not exceed the limits specified in the Cast-In-Place section of the Specifications.

D. Concrete Test Cylinders by the Testing Laboratory:

1. Molding and Testing:

Cylinders for strength tests shall be molded and Laboratory cured in accordance with ASTM C31 "Method of Making and Curing Concrete Test Cylinders in the Field" and tested in accordance with ASTM C39 "Method of Testing for Compressive Strength of Cylindrical Concrete Specimens".

2. Field Samples:

Field samples for strength tests shall be taken in accordance with ASTM C172 "Method of Sampling Fresh Concrete".

3. Frequency of Testing:

Each set of test cylinders shall consist of a minimum of four standard test cylinders. A set of test cylinders shall be made according to the following frequency guidelines:

a. One set for each class of concrete taken not less than once a day.
b. Mat Foundation: One set for each 250 cubic yards or fraction thereof.
c. All Other Concrete: A minimum of one set for each 150 cubic yards or fraction thereof.
d. No more than one set of cylinders at a time shall be made from any single truck.
e. If the total volume of concrete is such that the frequency of testing as specified above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.

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f. Frequencies assume one batch plant will be used for each pour. If more than one batch plant is used, the frequencies cited above shall apply for each plant used.

The cylinders shall be numbered, dated, and the point of concrete placement in the building recorded. Of the four cylinders per set break one at seven days, two at 28 days, and one automatically at 56 days only if either 28 day cylinder break is below required strength.

4. Cylinder Storage Box:

The Contractor shall be responsible for providing a protected concrete cylinder storage box at a point on the jobsite mutually agreeable with the Testing Laboratory for the purpose of storing concrete cylinders until they are transported to the Laboratory.

5. Transporting Cylinders:

The Testing Laboratory shall be responsible for transporting the cylinders to the Laboratory in a protected environment such that no damage or ill effect will occur to the concrete cylinders.

6. Information on Concrete Test Reports:

The Testing Laboratory shall make and distribute concrete test reports after each job cylinder is broken. Such reports shall contain the following information:

a. Truck number and ticket number
b. Concrete Batch Plant
c. Mix design number
d. Accurate location of pour in the structure
e. Strength requirement
f. Date cylinders made and broken
g. Technician making cylinders
h. Concrete temperature at placing
i. Air temperature at point of placement in the structure
j. Amount of water added to the truck at the batch plant and at the site and whether it exceeds the amount allowed by the mix design
k. Slump
l. Unit weight
m. Air content
n. Cylinder compressive strengths with type of failure if concrete does not meet Specification requirements. Seven day breaks are to be flagged if they are less than 60% of the required 28 day strength. 28 day breaks are to be flagged if either cylinder fails to meet Specification requirements.

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E. Other Required Tests of Concrete by the Testing Laboratory (unless noted otherwise):

1. Slump Tests:
Slump Tests (ASTM C143) shall be made at the beginning of concrete placement for each batch plant and for each set of test cylinders made.

2. Air Entrainment:
Air entrainment (ASTM C233) tests shall be made at the same time slump tests are made as cited above.

3. Concrete Temperature:
Concrete temperature at placement shall be measured at the same time slump tests are made as cited above.

4. Chloride Ions:

The Contractor shall have the laboratory verify in a written submittal with the mix designs that the chloride ion concentration will not exceed the limits specified.

Tests shall be run for each class of concrete according to AASHTO Designation T 260-82 Sampling and Testing for Total Chloride Ion in Concrete and Concrete Raw Materials to determine that the maximum chloride ion content does not exceed the limits stated in the concrete section of the specifications. One test shall be run for each set of cylinders specified to be taken for each class of concrete.

F. Evaluation and Acceptance of Concrete:

1. Strength Test:

A strength test shall be defined as the average strength of two 28 day cylinder breaks from each set of cylinders.

2. Quality Control Charts and Logs:

The Testing Laboratory shall keep the following quality control logs and charts for each class of concrete containing more than 2,000 cubic yards. The records shall be kept for each batch plant and submitted on a weekly basis with cylinder test reports:

a. Number of 28 day strength tests made to date.
b. 28 day strength test results containing the average of all strength tests to date, the high test result, the low test result, the standard deviation, and the coefficient of variation.
c. Number of tests under specified 28 day strength.
d. A histogram plotting the number of 28 day cylinders versus compressive strength.

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e. Quality control chart plotting compressive strength test results for each test.
f. Quality control chart plotting moving average for strength where each point plotted is the average strength of three previous test results.
g. Quality control chart plotting moving average for range where each point plotted is the average of 10 previous ranges.

3. Acceptance Criteria:

The strength level of an individual class of concrete shall be considered satisfactory if both of the following requirements are met:

a. The average of all sets of three consecutive strength tests equal or exceed the required f'c.

b. No individual strength test (average of two 28 day cylinder breaks) falls below the required f'c by more than 500 PSI.

If either of the above requirements is not met, the Testing Laboratory shall immediately notify the Engineer by telephone. Steps shall immediately be taken to increase the average of subsequent strength
tests.

G. Investigation of Low Strength Concrete Test Results:

1. Contractor Responsibility for Low Strength Concrete:

If any strength test of Laboratory cured cylinders falls below the required f'c by more than 500 psi, the Contractor shall take steps immediately to assure that the load carrying capacity of the structure is not jeopardized.

2. Nondestructive Field Tests:

The Testing Laboratory shall under the direction of the Engineer perform nondestructive field tests of the concrete in question using Swiss Hammer, Windsor Probe, or other appropriate methods as approved by the Engineer and report the results in the same manner as for cylinder test reports.

3. Core Tests:

If the likelihood of low strength concrete is confirmed and computations indicate that the load carrying capacity of the structure has been significantly reduced, tests of cores by the Testing Laboratory, drilled from the area in question under the direction of the Engineer, will be required in accordance with ASTM C42 "Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete". In such case, three cores shall be taken for each strength test more than 500 PSI below required

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f'c. If concrete in the structure will be dry under service conditions, cores shall be air dried (temperature 60° to 80°F, relative humidity less than 60 percent) for 7 days before test and shall be tested dry. If concrete in the structure will be more than superficially wet under service conditions, cores shall be immersed in water for at least 48 hours and tested wet. The Contractor shall fill all holes made by drilling cores with an approved drypack concrete.

4. Acceptance Criteria for Core Tests:

   Concrete in an area represented by core tests shall be considered structurally adequate if the average of three cores is equal to at least 85% of f'c and if no single core is less than 75% of f'c. If approved by the Engineer, locations of erratic core strengths may be retested to check testing accuracy.

5. Load Test:

   If the above criteria are not met and the structural adequacy remains in doubt, the Engineer may order a load test as specified in ACI 318 for the questionable portion of the structure.

6. Strengthening of the Structure or Demolition:

   If the structural adequacy of the affected portion of the structure remains in doubt, the Engineer may order the structure to be strengthened by an appropriate means or demolished and rebuilt.

7. Cost of Investigations for Low Strength Concrete:

   The costs of all investigations of low strength concrete shall be borne by the Contractor.

H. Jobsite Inspection:

The scope of the work to be performed by the inspector on the jobsite shall be as follows:

1. Verify that air temperatures at the point of placement in the structure are within acceptable limits defined above prior to ordering of concrete by the Contractor.

2. Inspect concrete upon arrival to verify that the proper concrete mix number, type of concrete, and concrete strength is being placed at the proper location.

3. Inspect plastic concrete upon arrival at the jobsite to verify proper batching. Observe mix consistency and adding of water as required to achieve target slumps in mix designs. Record the amount of water added and note if it exceeds that allowed in the mix design. The responsibility for adding water to trucks at the jobsite shall rest only with the

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Contractor's designated representative. The Contractor is responsible that all concrete placed in the field is in conformance to the Contract Documents.

4. Obtain concrete test cylinders.

5. Perform slump tests and air entrainment tests.

6. Record information for concrete test reports.

7. Verify that all concrete being placed meets job Specifications. Report concrete not meeting the specified requirements and immediately notify the Contractor, Batch Plant Inspector, Contractor, Architect, Engineer, and Owner.

8. Pick up and transport to Laboratory, cylinders cast the previous day.

9. Check concrete placing techniques to determine that concrete deposited is uniform and that vertical drop does not exceed six feet.

10. The jobsite inspector shall report any irregularities that occur in the concrete at the jobsite or test results to the Contractor, Architect, Owner, and Engineer.

I. Causes for Rejection of Concrete:

The Contractor shall reject all concrete delivered to the site for any of the following reasons:

1. Wrong class of concrete (incorrect mix design number).

2. Air temperature:

Air temperature limits shall be as follows:

a. Cold Weather: Air temperature must be 40°F and rising
b. Hot Weather: Air temperature must be cooler than 100°.

Concrete may be placed at other air temperature ranges only with approval of the job inspector for the Testing Laboratory or other duly appointed representative.

3. Concrete with temperatures exceeding 95°F may not be placed in the structure.

4. Air contents outside the limits specified in the mix designs.

5. Slumps outside the limits specified in the mix designs.

6. Excessive Age:

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Concrete shall be discharged within 90 minutes of plant departure or before it begins to set if sooner than 90 minutes unless approved by the Laboratory job inspector or other duly appointed representative.

The Contractor is responsible that all concrete placed in the field is in conformance to the Contract Documents.

J. Concrete Batch Trip Tickets:

All concrete batch trip tickets shall be collected and retained by the Contractor. Compressive strength, slump, air, and temperature tests shall be identified by reference to a particular trip ticket. All tickets shall contain the information specified in ASTM C 94. Each ticket shall also show the amount of water that may be added in the field for the entire batch that will not exceed the specified water cement ratio for the design mix. The Contractor and Testing Laboratory shall immediately notify the Architect/Engineer and each other of tickets not meeting the criteria specified.

3.6 STRUCTURAL STEEL

A. Contract Obligations:

1. Owner Responsibility:

The Owner shall pay for all initial field inspections and tests as required during the fabrication and erection of the structural steel.

2. Contractor Responsibility:

The Contractor shall arrange with the Testing Laboratory for the certification of all shop and field welders. Each bolting crew and welder shall be assigned an identifying symbol or mark and all shop and field connections shall be so identified so that the inspector can refer back to the person or crew performing the work. The costs of all retesting of material or workmanship not in conformance with the Contract Documents shall be borne by the Contractor. The Fabricator and Erector shall provide the Laboratory inspector with access to all places where work is being done. A minimum of 24 hours notification shall be given prior to commencement of work. The Contractor shall provide the Testing Laboratory with the following:

a. A complete set of Architect/Engineer reviewed shop and erection drawings including all revisions and addenda.
b. Cutting lists, order sheets, material bills, shipping bills, and mill test reports.
c. Information as to time and place of all rollings and shipment of material to shops.
d. Representative sample pieces requested for testing.
e. Full and ample means and assistance for testing all material.

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f. Proper facilities, including scaffolding, temporary work platforms, hoisting facilities, etc., for inspection of the work in the mills, shop and field.

3. Testing Laboratory Responsibility:

Inspection of field work shall be completed promptly so that corrections can be made without delaying the progress of the work. Inspections shall be performed by qualified technicians with a minimum of two years experience in structural steel testing and inspection. All inspection personnel shall be certified in accordance with AWS QC-1. The Testing Laboratory shall provide test reports of all shop and field inspections. Shop test reports shall include shop welders certifications. All test reports shall indicate types and locations of all defects found during inspection, the measures required and performed to correct such defects, statements of final approval of all welding and bolting of shop and field connections, and other fabrication and erection data pertinent to the safe and proper welding and bolting of shop and field connections. In addition to the parties listed in this Specification the Fabricator and Erector shall receive copies of all test reports.

4. Rejection of Material or Workmanship:

The Owner, Architect, Engineer, and Testing Laboratory reserve the right to reject any material or workmanship not in conformance with the

Contract Documents at any time during the progress of the work. However, this provision does not allow waiving the obligation for timely, in sequence inspections.

B. Mill Tests of Structural Steel:

1. Mill Order Steel:

The Fabricator shall furnish certified mill test reports and an affidavit stating that the structural steel furnished meets the requirements of the grade specified on the structural drawings for all mill order steel. In case of controversy, test of the material according to ASTM A6 or A568 as applicable made by the Contractor's Testing Laboratory with certified test reports paid for by the Contractor shall be made to verify conformity with ASTM standards. Tests shall be made for each 10 tons of material used unless approved otherwise by the Engineer.

2. Local Stock Steel:

Materials taken from stock by a Fabricator for use for structural purposes must be of a quality at least equal to that required by the ASTM specifications applicable to the classification covering the intended use. Certified mill test reports shall be accepted as sufficient record of the quality of materials carried in stock by the fabricator provided the stock

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steel can be identified by heat or melt numbers. In case of controversy, tests by the Contractor's Testing Laboratory with certified reports as specified for mill order steel shall be required.

3. If tests are required, test specimens shall be taken by the Contractor under the direction of the Testing Laboratory and shall be machined by the Testing Laboratory to dimensions as required by the applicable ASTM standards.

C. Field Inspections and Tests:

The Testing Laboratory shall provide inspection in the field for a period of time as determined in consultation with the Architect, Owner, and Engineer prior to the start of erection in a timely manner so as to not delay the start of erection. The following tests and inspections shall be made:

1. Obtain the planned erection procedure, and review with the Erectors supervisory personnel.

2. Verify field welding procedures and obtain welder certificates. (Including welding of cold formed framing.)

3. Check steel as received in the field for possible shipping damage, workmanship, and piece marking.

4. Check plumbness and frame alignment as erection progresses.

5. Check joint preparation and fit up, backing strips, and runout plates for welded moment connections and column splices.

6. Check preheating to assure proper temperature, uniformity, and thoroughness through the full material thickness.

7. Review welding sequence.

8. Visually inspect all field welding for size, length, and quality.

9. Perform nondestructive examination services for various weldments of field erection determined in consultation with the Structural Engineer prior to the start of erection. The Laboratory shall furnish a qualified technician with the necessary equipment to perform radiographic, ultrasonic, magnetic particle, or dye penetrant inspection as required for the item being tested and other duties as outlined for shop inspection in the previous Section. Unless specified otherwise, check all partial and complete penetration welds in connections of beams, girders, columns, and braces. Check 10% of connections with fillet welds. Visual inspection is required for all welds.

10. Check calibration of impact wrenches used in field bolted connections.

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11. Visually inspect the welding of metal deck to the structure.

12. Perform field tests on 10% of completed shear connectors in each beam according to inspection procedures outlined in AWS D1.1

The costs of repairing all defective welds and the costs of retesting by the Testing Laboratory shall be borne by the Contractor. If removal of a backing strip is required by the Testing Laboratory to investigate a suspected weld defect, such cost shall be borne by the Contractor.

3.7 MASONRY:

A. Prism Tests

1. Scope:

Prism tests shall be made for each class of masonry (hollow masonry, grouted masonry) on the project using an assembly of actual masonry units, mortar, and grout as planned in the work.

2. Compressive Strength Test:

Test shall be run according to the requirements of ASTM E447 "Test Methods for Compressive Strength of Masonry Prisms." Each strength test shall be defined as the average of three test prisms from the same class of masonry.

3. Frequency of Testing:

a. Interior Walls: One strength test shall be run for each 5,000 square feet of wall or fraction thereof.

b. Exterior Walls: One strength test shall be run for each 5,000 square feet of wall area but not less than one strength test for each day's operation for each class of wall. An additional test should be run whenever there is a change in mortar or grout proportions.

B. Mortar Test:

1. Scope:

Mortar cube test shall be required only for loadbearing masonry construction (hollow or grouted) for the purpose of measuring uniformity of field batching.

2. Compressive Strength Test:

Tests shall be run according to the requirements of ASTM C780 "Preconstruction and Construction Evaluation of Mortars for Plain and

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Reinforced Unit Masonry." Each strength test shall be defined as the average of three cube specimens two inches in dimension tests at 28 days.

3. Frequency of Testing:

One strength test shall be run for each 5,000 square feet of wall but not less than one strength test for each day's operation for each class of wall. An additional test should be run whenever there is a change in mix proportions.

C. Grout Tests:

1. Scope:

Grout prism tests shall be required for all grout used in masonry construction.

2. Compressive Strength Test:

Specimens shall be 3½"x3½"x7" or 3"x3"x6" cast in molds with a flat nonabsorbent base and masonry units having the same moisture condition as those being laid forming the sides of the specimens. Specimens shall be capped according to ASTM C617 and tested according to ASTM C39. Each strength test shall be defined as the average of two 28 day prisms.

3. Frequency of Testing:

Four grout prisms shall e made for each 30 cubic yards of grout but not less than one set for each day's operation. An additional set should be made whenever the grout mix is changed. One prism shall be tested at 7 days, two at 28 days, and one at 56 days only if either 28 day test is low.

D. Experience Requirement:

Field inspection of masonry construction by the Testing Laboratory as herein described shall be performed by qualified technicians with a minimum of ten years experience in masonry testing and inspection.

E. Field Inspection Requirements:

The duties and responsibilities of the Testing Laboratory Inspector in the field shall be as follows:

1. Review and become familiar with project drawings and specifications.

2. Review all masonry materials used in the field for conformance to project specifications. This shall include masonry units, mortar, grout, portland

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cement, masonry cement, sand, lime, horizontal joint reinforcement, ties, masonry anchoring devices, to the structure, and control joint strips.

3. Review proper horizontal joint reinforcement size and spacing. Review size and spacing of wall ties.

4. Review proper masonry construction practices for mortar including requirements for high and low lift grouting. Check conformance with hot and cold weather construction requirements.

5. Verify proper mortar batching proportions.

6. Confirm clean outs for high lift grouting.

7. Verify construction tolerances.

8. Review and confirm installation of reinforcing steel size, spacing, and splices in all walls, lintels, pilasters, and columns.

9. Confirm number and size of dowels in the foundation to walls and columns.

10. Take mortar, grout, and prism samples as specified.

END OF SECTION 01 41 00

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SECTION 01 45 00 – QUALITY CONTROL

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Quality Assurance: Requirements for material and product quality and control of installation.

B. Tolerances

C. References and Standards

D. Mock-ups

E. Testing Laboratory Services

F. Inspection Services

G. Manufacturers' field services

1.2 RELATED SECTIONS

A. Section 01 41 00 – Testing Laboratory Service

B. Section 01 33 00 - Submittal Procedures

C. Section 02 32 00 - Geotechnical Investigations

D. The Work of this Section shall be included as a part of all Sections of Work, whether referenced therein or not.

1.3 DESCRIPTION OF REQUIREMENTS

A. Unless specifically noted otherwise, perform all Work shown, mentioned, or reasonably inferred and comply with all work restrictions.

B. Many of the requirements specified elsewhere are included herein for reference and convenience. Where a conflict occurs between the Contract Documents, either within themselves or each other, the more stringent requirement or the most expensive combination of materials and workmanship shall prevail.

C. Contractor shall:
   1. perform Work in accordance with the General Conditions, as specified herein, and with the quality control requirements of each Specification Section;
   2. perform Work in the highest quality workmanship, unless specified otherwise;
   3. join materials with a uniform and accurate fit so they meet with neat straight lines, free of smears, overlaps or irregularities, as applicable to the work;
   4. install all exposed materials appropriately level, plumb, and at accurate angles as shown and flush with adjoining materials;
   5. attach materials with sufficient strength, and with number and spacing of fasteners and attachments that will not fail until materials joined are broken or permanently deformed;
   6. use concealed fasteners, unless shown or directed otherwise.

1.4 QUALITY ASSURANCE AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

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B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturer’s instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.5 TOLERANCES

A. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.6 REFERENCES AND STANDARDS

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Owner-Contractor Agreement except where specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.7 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be the comparison standard for remaining Work.

D. Where mock-up has been accepted by Architect/Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Architect.

E. Mock-up may be approved in phases as portions are completed.

F. Project Mock-up Requirements: Provide an actual sample panel with the following properties:

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1. Building Portion Size: Minimum 10 feet wide by full height of building tall at typical standard building section as determined by Architect. Mock up shall include the construction of wall to include all membrane air barriers, transitions, flashings, standard windows, prefinished aluminum canopy/ louver, etc. used in Project. Size may vary according to specific project requirements. Brace and support as required to withstand structural windloads.
2. Materials: actual exterior finishes including, but not limited to face brick, metal wall panel, and plaster, actual building materials and assemblies indicating brick patterns on masonry and stud back-up as occurs with dampproofing and flashing as detailed, actual portion of aluminum storefront indicating jam, sill and head attachment and flashing details, and where appropriate, provide mock-up of special finish details, insets and reliefs, reveals, expansion and control joints, brick ledges, brick head and sills, pipe penetrations and waterproofing materials. Provide roof edge flashing and gutter section (as applicable) in pre-finished color as selected by Architect to cap the mock-up panel. Include a sealant joint at least 16 inches long. Brick and Mortar color shall be selected by Architect prior to mock-up assembly.
3. Drawing: Contractor shall submit mock-up diagram for approval of minimum project requirements.

1.8 TESTING SERVICES

A. Owner will appoint, employ, and pay for specified services of an independent firm to perform testing.

B. The independent firm will perform tests and other services specified in individual specification sections and as required by the Architect/Engineer, Owner, or authority having jurisdiction.

C. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Architect/Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Owner, Architect/Engineer, and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations requiring services, or as specified in individual specification sections.
   2. Make arrangements with independent firm and pay for additional samples and tests required.

F. Testing does not relieve Contractor to perform Work to contract requirements.

G. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Sum/Price.

H. Refer to Section 01 41 00, Testing Laboratory Services, for additional information concerning testing, and submittal procedures and requirements for Testing Reports.

1.9 INSPECTION SERVICES

A. Owner will appoint, employ, and pay for specified services of an independent firm to perform inspection.

B. The independent firm will perform inspections and other services specified in individual specification sections and as required by the Architect/Engineer, Owner, or authority having jurisdiction.

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C. Inspecting may occur on or off the project site. Perform off-site inspecting as required by the Architect/Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Owner, Architect/Engineer, and Contractor, indicating inspection observations and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish safe access and assistance by incidental labor as requested.
   1. Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations requiring services, or as specified in individual specification sections.

F. Inspecting does not relieve Contractor to perform Work to contract requirements.

G. Refer to Section 01 41 00, Testing Laboratory Services, for additional information concerning inspections, and submittal procedures and requirements for Inspection Reports.

1.10 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as required, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect/Engineer within ten (10) days after receipt of Notice to Proceed, in advance of required observations. Observer subject to approval of Architect/Engineer and Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Refer to Section 01 33 00, Submittal Procedures, for additional information concerning submittal procedures and requirements for Manufacturers Field Reports.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

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END OF SECTION 01 45 00

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SECTION 01 45 23
TESTING REQUIREMENTS

PART 1 – GENERAL
1.01 Summary
A. This specification shall govern the testing requirements for civil site work associated with the project. In the event the governing authority's testing requirements are more stringent than the requirements set forth herein the governing authority's requirements shall be followed.

PART 2 – PRODUCTS
2.01 Supplier Mix Data & Certifications
A. Mix Designs, furnished by supplier, shall be presented to Engineer
   1. Surface Course Mix Designs
      a. 1 per mix design
B. Mill Certificates, furnished by supplier, shall be presented to Engineer
   1. Lime Stabilized Subgrade
      a. 1 per load
   2. Flexible Base
      a. 1 per load

PART 3 - EXECUTION
3.01 Testing Requirements
A. Concrete Strength Test (@ 28 days unless noted otherwise on plans)
   1. Curb, Gutter or Curb and Gutter
      a. 1 set of 3 per 500 Linear Feet
   2. Sidewalks and Driveways
      a. 1 set of 3 per 4,000 Square Feet
   3. Inlets and Manholes
      a. 1 set of 3 per every 3 inlets
   4. Retards, Backup walls and Anchors
      a. 1 set of 3 per 30 Cubic Yards or less
   5. Riprap and Small roadside sign
      a. 1 set of 3 per 50 cubic yards or less
   6. Anchors
      a. 1 set of 3 per 30 cubic yards or less
   7. Culverts (except top slab of direct traffic culverts), Headwalls and Wing walls
      a. 1 set of 3 per 30 cubic yards or less
   8. Culverts (except top slab traffic culverts), Headwalls, Wing walls
      a. As required by Drawings and / or Owner
   9. Riprap
      a. 1 set of 3 per 50 cubic yards or less
   10. Pavement
      a. 1 set of 3 per 75 Cubic Yards for each pavement type (Light Duty, Heavy Duty, Dumpster Pad, etc.)
B. Field Sieve Analysis after final mixing
   1. Lime stabilized Subgrade

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        a. 1 per day
C. Eades & Grim Test
    1. Lime stabilized Subgrade
        a. 1 for each soil type
D. Atterberg Limits & Gradation Test
    1. Caliche
        a. 1 per 5,000 Cubic Yards
E. Los Angeles Abrasion Loss Test
    1. Flexible Base
        a. 1 per 5,000 Cubic Yards
F. Hot Mix Asphalt Concrete Tests
    1. Lab site sampling, Molding, Lab Density, Stability, Maximum Theoretical Specific Gravity (Rice Gravity), Extraction
        a. 1 per project or 1 per 500 tons
    2. Cored In-Place Density, Air Voids, Thickness of Compacted Mix
        a. 1 per 2,500 Square Yards
G. Painted Pavement Markings Dryness Test
    1. 1 per day
H. Cured-In-Place-Pipe (CIPP)
    1. 1 per month
I. Compaction testing
    1. 1 per section between main line valves and every 100’ of main pipe per 2’ vertical of backfill material to top of Final Backfill, not including Topsoil Backfill Material, starting at 2’ above top of pipe.
J. Manhole Leakage Testing
    1. 1 per manhole
K. Hydrostatic Testing of Water System
    1. 2 per pipe
L. Wastewater Utility Piping Testing
    1. 1 per pipe
M. Wastewater Utility Force Main Piping
    1. 1 per pipe
N. Stormwater Gravity Piping
    1. 1 pipe for each 300 pipes

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SECTION 01 50 00 – TEMPORARY FACILITIES AND CONSTRUCTION

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

TEMPORARY SERVICES - GENERAL

A. Provide all temporary services and facilities as specified below, and as required for the proper and expeditious prosecution of the work. Provide all labor, materials, equipment and appliances necessary for the complete installation, operation and maintenance of all temporary service systems and facilities as may be required during work on the project.

UTILITIES

A. Cost: The School District shall provide all temporary electrical and water as may be required to complete work on the project. The Contractor shall be responsible for temporary connection to these existing utilities and for disconnection from them and returning points of connections to original condition.

HEATING, COOLING & LIGHTING

A. Adequate lighting must be provided throughout the project. Provide and maintain lighting for construction operations.

B. Provide and maintain lighting to exterior staging and storage areas for security purposes.

C. Provide heating and cooling devices as needed to maintain specified conditions for construction operations.

D. The permanent heating and cooling system should be put in operation as soon as possible and shall be used to dry out the building and to provide suitable conditions for finish work.

SANITARY FACILITIES

A. The Contractor shall provide suitable temporary toilet facilities near the location of the work. Temporary toilets shall be maintained in a sanitary condition at all times and shall be placed in the least obtrusive location available.

STORAGE

A. Each Contractor shall provide suitable means to protect all stored material subject to damage from the weather.

B. Contractors may use portions of existing parking lots for storage if approved in advance by Owner. Contractors must protect these areas and return them to their original condition upon completion of the work.

FENCES

A. Contractors must provide temporary fencing and other barricades to protect stored materials on the site and provide a secure and safe work area around the project.

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B. Coordinate size and location of all fenced storage and work areas with the Owner and Architect prior to erection.

C. Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized steel, chain-link fabric fencing. 6 feet high minimum with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top rails.
    1. Securely anchor posts into ground with minium 30 inch deep, 12 inch diameter concrete filled post holes at 6 feet on center max.

D. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized steel, chain-link fabric fencing. 6 feet high minimum with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top rails.
    1. Provide concrete, tire or pipe bases for supporting posts.

E. Provide 6 foot high fence around construction site; equip with locable vehicular gates.

OFFICES

A. Contractor shall provide his own office on the premises, maintain it, and remove it when directed to by Owner. Contractor shall furnish office space for the Architect as well as for himself.

B. Coordinate size and location of all offices with the Owner and Architect prior to erection or placement on the premises.

PROTECTION OF PROPERTY & PERSONS

A. Protect all new or existing walks, curbing, drives, parking lots, bleachers, football field, track, and lawn areas. All damage caused by the Contractor or any Subcontractors shall be made good at the expense of the Contractor.

B. Provide necessary barricades to protect persons entering, leaving or walking around construction areas during the course of the work or during periods when no work is in progress but when conditions around the construction areas could pose a danger.

PROTECTION OF INSTALLED WORK

A. Protect installed work and provide special protection where required.

B. Provide temporary and removable protection for installed products. Control construction activity in immediate work area to prevent damage.
C. Provide protective coverings at walls, projections, jambs, sills and soffits of openings.

D. Protect finish floors, stairs and other surfaces from traffic, dirt, wear, damage or movement of heavy objects by protecting with durable sheet materials.

E. Prohibit traffic or storage on waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterprooffing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

ACCESS ROADS AND PARKING

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A. Construct and maintain temporary roads accessing thoroughfares to serve construction area.

B. Provide and maintain access to fire hydrants, free off obstructions.

C. Provide temproary gravel surface parking areas to accommodate construction personnel within the stie space.

D. Do not allow vehicle parking on existing pavement without written approval from school district allowing construction employee parking.

CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain project site in a clean and orderly condition.

B. Remove debris and rubbish from masonry cavities, pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces prior to enclosing the space.

C. Broom and vacuum clean interior areas daily and prior to start of any interior finish work to eliminte dust.

REMOVAL OF UTILITIES, FACILITIES AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials prior to Substantial Completion.

B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

JOB IDENTIFICATION SIGN

A. The Contractor shall provide and erect where directed a job sign. Provide 8 feet wide x 4 feet high job sign of exterior grade plywood and wood frame construction, painted, with die cut vinyl, self-adhesive letters and logos to Architect’s design and colors.

B. The sign shall list the names of the Project, the Owner, the Architect, his Consultants, the General Contractor and whichever Subcontractors the General Contractor chooses. Work shall be done by an experienced sign company in a neat and professional manner.

C. No other signs shall be erected on the job site without permission from the Architect or Owner except those required by law.

END OF SECTION 01 50 00

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SECTION 01 57 23
STORM WATER POLLUTION PREVENTION

PART 1 - GENERAL

1.01 Description
A. This specification shall govern all work required for temporary Storm Water Pollution Prevention.
B. The work described in this section is applicable to all sections of the contract documents. All work that would disturb the existing site conditions or present the potential for site runoff shall adhere fully to this specification section.

1.02 References *The latest edition of the referenced item(s) below shall be used and obtained by the Contractor*
A. The TCEQ TPDES Construction General Permit (CGP) No. TXR150000 effective March 5, 2018 (or most current version). This specification requires compliance with all provisions of the TCEQ TPDES permit.
B. The project SWPPP provided with the construction plans.
C. City of Corpus Christi ordinance 022941, *Storm Water Quality Management Program*.
D. Any applicable local ordinance or regulation pertaining to storm water pollution control or prevention.

1.03 Submittals
A. Submittals of products used in structural and non-structural controls shall be made through established procedures prior to installation on the site. The Contractor shall make available physical samples and product literature on any material used in structural or non-structural controls during the course of the project prior to its implementation in the field.
B. Construction and shop drawings containing deviations from local, state, and federal standards and regulations or special designs shall be sealed by a Registered Professional Engineer of the State of Texas and retained and paid by the Contractor.

1.04 Definitions *The words defined in this section shall for the purpose of this specification have the meanings ascribed to them.*
A. BMP – Best Management Practices
B. CSN – Construction Site Notice (Large CSN for large sites; Small CSN for small sites)
C. EHS – Environmental Health and Safety
D. NOI and NOT – Notice of Intent and Notice of Termination for TPDES permits
E. ODR – Owner Designated Representative
F. Land Disturbance – Any activity which affects the ground surface and/or vegetation
G. SWPPP – Storm Water Pollution Prevention Plan
H. TCEQ – Texas Commission on Environmental Quality
I. TPDES – Texas Pollutant Discharge Elimination System
J. Large Construction Activities – Construction activities including clearing, grading and excavating that result in land disturbance equal to or greater than 5 acres of land.
K. Small Construction Activities - Construction activities including clearing, grading and excavating that result in land disturbance equal to or greater than 1 acre and less than 5 acres of land.
L. Under 1 Acre Construction Activities - Construction activities including clearing, grading, excavating, or any activity which affects the ground surface and/or vegetation that results in land disturbance under 1 acre of land

1.05 Quality Assurance
A. In order to minimize the discharge of pollutants to storm water, the Contractor shall implement all permanent and temporary site controls according to TPDES Guidelines, as

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set forth by the TCEQ.

B. Implementation of site controls shall be performed by a qualified contractor experienced in the proper installation of such devices in accordance with manufacturers' specifications, and in keeping with both recognized Best Management Practices (BMPs), and TPDES regulations.
C. The Contractor shall inspect all BMPs at regular intervals as specified in the Storm Water Pollution Prevention Plan for this project. Use standard Owner Inspection forms for each inspection. Record all deficiencies of site controls and take immediate action to correct any deficiencies recorded. Keep records of inspections current and on file, available for review by EPA, TCEQ, MS4 Operator and Owner.

PART 2 - PRODUCTS

2.01 Materials *Specific site control devices are identified in the SWPPP provided with the construction plans. Where such devices are indicated, their material composition shall comply with this section. Refer to the construction plans for details of listed materials. Projects may propose alternative BMPs, as long as they are effective at performing the desired functions.*

A. Temporary Sediment Control Fence (Silt Fence)
B. Inlet Protection
C. Rock Filter Dam (Rock Check Dam)
D. Stabilized Construction Entrance/Exit
E. Tracking Control Mat
F. Mulch Sock
G. Triangular Filter Dikes: for use on surfaces or in locations where standard silt fence cannot be implemented
H. Concrete, Paint and Stucco Washout: shall be used for containment of fluids from concrete truck washout wastes.
I. Temporary Storage Tanks: shall be used for temporary storage of fuels on the construction project site.
J. Diversion Dike
K. Interceptor Swale
L. Erosion Control Matting: shall be used on steep slopes, in drainage swales, and in high traffic pedestrian areas of barren soil. It shall include one or more of the following:
    1. Jute Mat – a plain fabric made of jute yarn, woven in a loose and simple manner, with a minimum unit weight of 2.7 pounds per square yard. Width shall be as required for the dimensions of the area to be covered.
    2. Wood Fiber Mat – a mat composed of wood fibers, which are encased in nylon, cotton or other type of netting
    3. Synthetic Webbing Mat – a mat manufactured from polyvinyl chloride or polypropylene monofilaments, which are bonded together into a three-dimensional web to facilitate erosion control and/or re- vegetation.
    4. Organic Mulches: shall be used for covering bare soil, retaining moisture under existing vegetation being preserved, and for absorbing the energy of compaction caused by foot or vehicular traffic. Refer to Exhibit M.
M. Any other materials indicated in the SWPPP.

PART 3 - EXECUTION

3.01 General Information

A. The Contractor shall provide a complete installation of all site control devices and measures

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(BMPs) indicated in the SWPPP, and as specified herein. These BMPs must be confirmed as fully operational with the Owner before any work that disturbs the site can begin.

B. As an alternative to the BMPs indicated in the SWPPP, and as specified herein, the Contractor may propose alternate BMPs that perform the same function as the indicated BMP but may be of a different configuration, materials, or type for review and approval by Engineer. Installation of alternate BMPs shall not proceed until reviewed and approved by Engineer.
C. The Contractor shall provide inspection and monitoring of controls in place and shall perform all revisions and updating of SWPPP. An accurate, chronological record of all Contractor inspections, revisions and additional controls shall be kept on file at the project site, for review, with a copy of the SWPPP.
D. The Contractor shall submit the NOT to the Owner after all disturbed areas are re-established (stabilized) with vegetative cover following completion of construction. Following acceptance of stabilized areas, all site controls that are no longer necessary shall be removed.

3.02 Contractor Responsibilities

A. This project requires implementation of storm water Best Management Practices for control devices and monitoring by the Contractor to comply with all provisions of the SWPPP developed for the project by the Engineer. The Contractor must fulfill all TPDES regulatory requirements, including the filing of the NOI and NOT or signing and posting of the CSN.
B. The Contractor shall provide signatures of a Corporate Officer for the NOI, Large CSN, Small CSN, NOT and any other forms or applications as required by the TPDES Construction General Permit TXR150000. The Contractor shall also provide delegated authorization to sign reports per 30 TAC 305.128. Individuals conducting site inspections shall be qualified to the satisfaction of the Owner.
C. The Contractor shall insert a copy of the signed NOI, and Large or Small CSN into the SWPPP book to be kept at the jobsite.
D. The SWPPP book kept at the jobsite shall also contain the following:
    1. A letter delegating signature authority to the field personnel for the Contractor
    2. A copy of the TPDES permit when received
    3. A copy of the Large or Small CSN
    4. A copy of the SWPPP provided with the construction plans
E. The Contractor shall review the SWPPP and verify existing conditions at the site before determining scope of implementation of site controls. Site survey and site plan drawings shall be used for additional reference. The Contractor shall notify the Owner, in advance, of this site review to allow for Owner participation.
F. The Contractor shall construct a Project SWPPP sign and place it at the main entrance to the project site. This sign shall include the NOI and TPDES permit along with the TCEQ TPDES Large or Small CSN, depending on the size of the construction project.
G. The Contractor shall complete the SWPPP Project Start-up form and shared SWPPP Acceptance Form as required before commencing soil disturbing activities.
H. The Contractor shall provide all material, labor, equipment and services required to implement, maintain and monitor all erosion and sedimentation controls in compliance with the SWPPP. All controls implemented by the Contractor shall comply with the TPDES regulations as issued by the TCEQ with most current version. These controls shall remain in operation until project completion and re-establishment of the site to pre-existing conditions (or improved) or longer as directed by the ODR. The work shall include, but not be limited to, the following:
    1. All earthwork as required to implement swales, dikes, basins and other excavations

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for temporary routing of utilities, to protect against erosion or sediment-laden (polluted) storm water runoff.

2. All structural controls as shown or specified, including silt fences, sediment traps, stabilized construction entrance, subsurface drains, pipe slope drains, inlet/outlet protection, reinforced soil retention, gabions, rock berms, etc.
3. All non-structural controls as shown or specified, including temporary or permanent vegetation, mulching, geotextiles, sod stabilization, preservation of vegetative buffer strips, preservation/protection of existing trees and other mature vegetation.
4. All modifications and revisions to SWPPP necessary to meet changing site conditions and to address new sources of storm water discharges, as the work progresses.
5. All maintenance and repair of structural and non-structural controls in place shall continue until final stabilization is achieved or as directed by the ODR.
6. Weekly site inspections, as required by the SWPPP, of pollutant sources, including hazardous sources, structural and non-structural controls, and all monitoring of SWPPP revisions and maintenance of inspection records.
7. Removal of all structural and non-structural controls as necessary upon completion, and only after final stabilization is achieved.
8. Filing of NOT within 30 days of final stabilization being achieved and being approved by the Owner, or of another Operator assuming control of the un-stabilized portions of the site.
9. Refer to the SWPPP for additional requirements to ensure compliance with TPDES regulations.

3.03 Inspection

A. Inspection and maintenance is required for all areas disturbed by construction activity and for all erosion and sediment controls that are used. Inspection shall be performed at least once a week, and within 24 hours of a storm event of 0.5 inches or greater for as long as a portion of the site is disturbed.
B. The Contractor should select one individual who will be responsible for the inspection and maintenance of the system. The inspector will look at the control measures and determine if they are performing correctly and effectively.
C. Reports shall be prepared and stored in accordance with the CGP.
D. Additional information may be found on the SWPPP provided with the Construction plans.

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SECTION 01 60 00 - EXTRA STOCK

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 GENERAL: The Owner is to be provided extra stock of materials under certain sections of the work. These items will be delivered to the Owner's designated storage facility at the end of the project. Applicable items include the following:

A. SECTION 08 71 00 - FINISH HARDWARE: Furnish 3 dozen extra screws and other fasteners of each size, type and finish used with the hardware items provided. These screws and fasteners are to be delivered to the hardware installer for use during installation. All extra screws and fasteners and all special installation tools furnished with the hardware shall be turned over to the owner at the completion of the job. All installation tools provided by the manufacturers shall be turned over to the owner at the completion of the job.

B. SECTION 09 30 00 - TILING: Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents. Furnish quantity of full-size units equal to 50 SF of amount installed, for each type, composition, color, pattern, and size indicated.

C. SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS: Deliver to the Owner for his use in future modifications, an extra stock of approximately 200 SF of each type of acoustical material installed, packaging each type of material separately, distinctly marked, and adequately protected against deterioration.

D. SECTION 09 65 16 – COMMERCIAL VINYL FLOORING: Deliver to the Owner for his use in future modifications an extra stock of approximately 100 SF of each color and pattern in each material installed under this Section, packing each type of material separately, distinctly marked, and adequately protected against deterioration.

F. SECTION 09 90 00 - PAINTING: Upon completion of the work of this Section, deliver to the Owner an extra stock equaling 5 gallons of each color, type, and gloss of paint used in the work, tightly sealing each container, and clearly labeling with contents and location where used.

PART 2 - PRODUCTS: Not used.

PART 3 - EXECUTION: Not used.

END OF SECTION 01 60 00

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SECTION 01 77 00 – PROJECT CLOSEOUT

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

GENERAL

A. Comply with all requirements of the contract. Send notices, furnish certificates, affidavits and other requirements to complete contract.

SUBSTANTIAL COMPLETION

A. When entire project (or specified area of the project, if requested by Owner) has reached Substantial Completion as defined in the General Conditions, as may be amended or supplemented, the Contractor shall send written notice and a comprehensive list (a punch list) of items to be completed or corrected to the Architect.

B. The Architect will then make a preliminary inspection to determine the status of completion and prepare a supplementary list of items requiring completion or correction in addition to Contractor's list for use of the Contractor. This combined list shall constitute the "punch list" for the project.

C. When all requirements of the General Conditions, as may be amended or supplemented, have been achieved then the Architect will prepare and issue a Certificate of Substantial Completion, AIA Document G 704, to be signed by the Owner and Contractor. This document will be accompanied by a list of any items remaining to be completed on the "punch list" prepared by the Contractor, supplemented by and approved by the Architect.

OPERATIONS INSTRUCTIONS, MANUALS, CERTIFICATIONS & RECORD DRAWINGS

A. Instruct Owner's representatives in the operation of all mechanical, electrical, plumbing and other building systems as specified. All such instructions shall be coordinated with the Owner's Designated Representative.

B. Deliver keys to Owner along with typed keying schedules and additional master keys, sub-masters or special keys.

C. Deliver to the Architect all required written guarantees and warranties prepared and bound in duplicate for his review and delivery to Owner.

D. Deliver to the Architect all required certificates of inspection prepared and bound in duplicate for his review and delivery to Owner.

E. Deliver to the Architect all required bound operational manuals for his review and delivery to Owner.

F. Deliver to the Architect all required hazardous material certifications, **including MSDS sheets**, prepared and bound in duplicate for his review and delivery to Owner.

G. Deliver to the Architect required Record Drawings for his review and delivery to Owner.

CLOSEOUT LEGAL DOCUMENTS

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A. The following AIA Documents must be completed and delivered to the Architect for review and delivery to the Owner.

1. Contractor's Affidavit of Payment of Debts and Claims, G706, for General Contractor and all major Sub-Contractors and Suppliers.
2. Consent of Surety Company to Final Payment, G707.
3. Consent of Surety Company to Reduction in or Partial Release of Retainage, G707A, if necessary.

B. Contractor must provide copy of Maintenance Bond, which is required to extend for the one (1) year period of guarantee to insure his performance under the terms of his obligation.

FINAL INSPECTION

A. Contractor shall notify the Architect when project is finally complete and all of the above requirements have been met.

B. Architect will then notify Owner and make a final inspection.

FINAL PAYMENT

A. Contractor shall submit the final Application and Certificate for Payment to the Architect after elapse of time stipulated in the contract, indicating all contract sum adjustments.

B. The Architect will approve and deliver to the Owner the final Application and Certificate for Payment upon completion of the final inspection and receipt and approval of all required closeout documentation.

GUARANTEE/WARRANTY INSPECTION

A. The Contractor shall be required to join the Architect and Owner, if notified to do so, in a walkthrough of the project within 30 days of the expiration of the general one (1) year project guarantee/warranty to determine if any work is still required under the terms of the guarantee/warranty.

END OF SECTION 01 77 00

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SECTION 01 78 39 – RECORD DOCUMENTS, AS-BUILT DRAWINGS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

AS-BUILT DRAWINGS

A. The Contractor shall provide as-built drawings which clearly show all differences between the contract work as drawn and as actually installed, as well as work added to the contract which is not indicated on the contract drawings.

B. Special attention should be paid to precisely documenting changes to concealed work, meaning work installed underground or in areas which can not be readily inspected by use of access panels, inspection plates or other removable features.

C. The Contractor shall maintain a set of record drawings at the job site. These drawings shall be kept legible and current and shall be available for inspection at all times by the Architect.

D. Upon substantial completion of the work, transfer the changes noted on the record drawings to the as-built drawings.

E. As-built drawings shall be prepared on Xerox copies paid for by the Contractor from the as-built drawing allowance. As-builts shall be provided for all sheets of the drawings.

F. In showing changes in the work or added work, use the same legends as used on the contract drawings. The as-built drawings shall consist of a complete set of Xerox copies. If no changes are made on a particular as-built drawing, a notation reading “No Change” shall be made in the lower right hand corner of the drawing.

G. As-built drawings shall contain the names, addresses and phone numbers of all the Subcontractors and shall be signed by the Contractor.

H. Upon completion of the as-built drawings, submit one set of as-built copies to the Architect for approval. Any changes required by the Architect must be made and upon receipt of approval of modified drawings, deliver the as-built Xerox copies plus one additional set of as-built copies. The additional set of as-built copies shall be at Contractor’s expense and are not part of the as-built drawing allowance.

I. The Architect shall be the sole judge of acceptability of the as-built drawings. Final payment on the project will not be made until the as-built drawings and copies as described above are delivered to and accepted by the Architect.

END OF SECTION 01 78 39

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SECTION 01 83 12 – WINDSTORM RATED CONSTRUCTION

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provision of the contract, including general and supplements/conditions and other Division 1 specifications sections, apply to this section.

1.2 SUMMARY

A. All components and cladding must meet or exceed the wind load requirements as specified in this section.

B. Exterior wall and roof openings shall be protected with impact resistant covers or designed to meet impact resistance requirements.

1.3 DEFINITIONS

A. Components and cladding: Elements assembled to form the exterior wall and roof systems that are either directly loaded by the wind or receive wind loads originating at relatively close locations, and that transfer those loads to the main wind force resisting system. Examples: Curtain walls, exterior glass windows and panels, roof sheathing, studs, soffits, etc.

B. Exterior wall and roof openings: openings that are likely to be breached during high winds. Examples: windows, doors, roof hatches, louvers, etc.

1.4 DESIGN REQUIREMENTS

A. Wind pressures are based on the provisions of the American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures, ASCE 7-10 and the following criteria:

   a. Ultimate design wind speed (Vult): 152 MPH (3 second gust)
   b. Nominal design wind speed (Vasd): 118 MPH (3-second gust)
   c. Building risk category: III
   d. Wind exposure category: B
   e. Internal pressure coefficient (GCpi): +0.18/-0.18

B. Impact resistance shall be as determined by the Texas Windstorm Code.

C. Wind loads must also meet requirements of the International Building Code (IBC), 2021 edition, with Texas Revisions.

D. Various sections of the specifications for certain building components will state minimum PSF pressures which have been calculated by the engineer of record for this project.

1.5 SUBMITTALS

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A. All components and cladding listed in the Texas Windstorm Approved Materials catalog shall have the appropriate product evaluation number indicated on the submittal. Miami Dade County Notice of Acceptance reports will also be accepted if the testing stadards used by the NOAA also comply with the adopted windstorm codes used by the Texas Department of Insurance

B. Components and cladding not listed will require certification that they meet or exceed the design requirements of this section by the manufacturer.

C. Installation instructions indicating fasteners, minimum attachment requirements, and other necessary pertinent information for installation shall be submitted.

D. Submit shop drawings (or other submittals) as soon after execution of contract. All submittals with components which must meet Texas Windstorm Code requirements will be forwarded to project structural engineer for approval prior to receiving final approval from the architect. This process, on certain components, may take more time than is typically associated with submittal approval for similar items not requiring Windstorm compliance.

PART 2 - PRODUCTS

2.1 GENERAL: WINDSTORM CERTIFICATION BY THE TDI IS REQUIRED ON THIS PROJECT. PRODUCT DATA FOR THE REQUIRED ITEMS SHALL MEET THE REQUIREMENTS OF INLAND I ZONE. ALL PRODUCTS, MATERIALS, AND INSTALLATION SYSTEMS FOR BUILDING ENVELOPE SYSTEMS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO PURCHASE.

A. It is preferred that all products, materials, and installation systems be evaluated and approved by the TDI Windstorm Inspection Program and be listed in the TDI Product Evaluation Index here: http://www.tdi.state.tx.us/wind/prod/. All reports shall be submitted to the Engineer. Other products, materials, and installation systems not listed shall meet one of the following:
   1. Tested to meet the Performance Requirements and any other requirements of the TDI Windstorm Inspection Program here: http://www.tdi.state.tx.us/wind/submittal_requi.html. All reports shall be submitted to the Engineer.
   2. Engineered to meet the Performance Requirements, and sealed calculations and drawings shall be submitted to the Engineer.

2.2 CORROSION RESISTANCE: THE FOLLOWING ARE REQUIREMENTS FOR ALL FASTENERS OF BUILDING ENVELOPE SYSTEMS FOR INLAND I ZONE. ALL FASTENERS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO PURCHASE.

A. Fasteners in open areas shall be stainless steel (ASTM A167), hot-dipped galvanized after fabrication (ASTM A123 or ASTM A153), hot-dipped galvanized or galvannealed prior to fabrication (ASTM A 653), hot-dipped galvanized or electrogalvanized (ASTM A641), mechanically deposited zinc coatings (ASTM B 659), or have electrodeposited zinc coatings (ASTM A641).
   1. Open areas include porches, decks, carports, exterior wall coverings, roof coverings, metal ties for stone veneer, underside of elevated structures, anchors securing mechanical equipment, roof vent attachments, and impact protective systems (shutters).
   2. Exception: Corrosion resistance is not required for 1/2" diameter or greater steel bolts.

B. Fasteners in vented or enclosed areas may either meet the provisions for open areas or be epoxy-coated (ASTM A899).

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1. Vented or enclosed areas include attics, exterior wall stud cavities, crawl spaces, window and door attachments, roof sheathing, and wall sheathing.
2. Exception: Corrosion resistance is not required for 1/2" diameter or greater steel bolts.

C. Fasteners in conditioned areas are not required to be corrosion resistant.
1. Conditioned areas include heated and cooled areas.

PART 3 - EXECUTION

A. The contractor shall provide, and have available at the job site, all necessary installation instructions during construction.

B. Prior to installing and prior to covering or concealing the fasteners or connectors, the contractor shall notify the architect and engineer. **DO NOT COVER UP FASTENERS WITHOUT HAVING THEM REVIEWED BY THE ENGINEER**.

C. Contractor shall furnish, upon completion, written confirmation of the installation and materials used of all components and cladding is in conformance with requirements of this section to the structural engineer.

END OF SECTION 01 83 12

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SECTION 02 32 00 – GEOTECHNICAL INVESTIGATION

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 GENERAL

A. A copy of the original geotechnical report dated March 11, 2005 is appended to the end of this Section and is titled as follows:

GEOTECHNICAL ENGINEERING REPORT
Calallen High School Stadium Renovations
4205 Wildcat Drive
Corpus Christi, Texas
PSI Project No. 0312-3551

1.2 REPORT CONTENTS

A. The information and recommendations contained in the soils report were obtained by the Owner primarily for the use of the Architect and the Structural Engineer in the design and preparation of the Contract Documents for this Project.

B. The report is not a warranty of subsurface conditions at the Project sites. Should subsurface conditions be found to vary substantially from this report, changes in design and construction foundations will be made, with resulting credits or expenditures to Contract Price/Sum.

C. Bidders are encouraged to visit the Project site and acquaint themselves with all existing conditions prior to bidding. Bidders may, at their own expense, perform additional subsurface investigations; however, all such investigations must be performed under arrangements approved in advance by the Architect.

1.3 TESTING AND INSPECTIONS

A. Refer to Section 01 41 00 Testing Lab Services.

END OF SECTION 02 32 00

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GEOTECHNICAL ENGINEERING REPORT

Calallen High School Stadium Renovations
4205 Wildcat Drive
Corpus Christi, Texas
PSI Project No. 0312-3551

PREPARED FOR:

Calallen ISD
4205 Wildcat Drive
Corpus Christi, Texas 78410

July 11, 2025

BY:

PROFESSIONAL SERVICE INDUSTRIES, INC.
2020 N. Loop 499 Ste. 302
Harlingen, Texas 78550
Phone: (956) 423-6826

Professional Service Industries, Inc.
2020 N. Loop 499 Ste. 302
Harlingen, Texas 78550
Office – (956) 423-6826

July 11, 2025

Calallen ISD
4205 Wildcat Drive
Corpus Christi, Texas 78410-5108

Attn: Mr. Blair McDavid

RE: **Geotechnical Engineering Recommendations**
Calallen HS Stadium Renovations
4205 Wildcat Drive
Corpus Christi, Texas
PSI Project No. 0312-3551

Dear Mr. McDavid:

Professional Service Industries, Inc. (PSI), an Intertek company, is pleased to submit this Geotechnical Engineering Report for the above-referenced project in Corpus Christi, Texas. This report includes the results from the field and laboratory investigation along with recommendations for use in preparation of the appropriate design and construction documents for this project.

PSI appreciates the opportunity to provide this Geotechnical Engineering Report and looks forward to continuing participation during the design and construction phases of this project. PSI also has great interest in providing materials testing and inspection services during the construction of this project and will be glad to meet with you to further discuss how we can be of assistance as the project advances.

If there are questions pertaining to this report, or if PSI may be of further service, please contact us at your convenience.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.
Texas Board of Professional Engineers Certificate of Registration # F003307

Axell Figueroa C.
Project Engineer
axell.figueroa@intetek.com



July 11, 2025

Philip L. Johnson, P.E.
Senior Geotechnical Engineer
Principal Consultant - Geotechnical Services
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1.0 PROJECT INFORMATION

1.1 PROJECT AUTHORIZATION

Professional Service Industries, Inc. (PSI), an Intertek company, has completed a field exploration and geotechnical evaluation for the proposed Calallen High School Stadium Renovations in Corpus Christi, Texas. Ms. Emily Lorenz, Superintendent, representing Calallen ISD, authorized PSI's services on April 28, 2025, by approving PSI Proposal No. 450350 and by Issuing Purchase Order No.8882500245. PSI's proposal contained a proposed scope of work, lump sum fee, PSI's General Conditions.

1.2 PROJECT DESCRIPTION

Based on information provided by the Client and PSI's review of an annotated partial site plan indicating the requested boring locations, and the results of this geotechnical investigation, a summary of our understanding of the proposed project is provided below in the following General Project Description table.

TABLE 1.1: GENERAL PROJECT DESCRIPTION

Project Items	Two possible concession stands New Press Box
Building Construction Types	1-story concession buildings will be wood or metal-framed Press Box is expected to be metal-framed
Existing Grade Change within Building Pad Area	± 1 Foot Estimated
Existing Grade Change within Project Site	± 2 Feet Estimated
Finished Floor Elevation	Not available at this time
Requested Foundation Type	Drilled Shafts; Drilled and Underreamed Piers; Monolithic Stiffened Beam and Slab-on-Grade, Spread Footings and Grade Beams
Maximum Design Column Loads	150 kips (estimated)
Maximum Design Wall Loads	2.5 kips per Lineal Foot (estimated)

The geotechnical recommendations presented in this report are based on the available project information, structure locations, and the subsurface materials encountered during the field investigation. If the noted information presented above is incorrect, please inform PSI so that the recommendations presented in this report can be amended, as necessary. PSI will not be responsible for the implementation of provided recommendations if not notified of changes in the project.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of this study is to evaluate the subsurface conditions at the site and develop geotechnical engineering recommendations and guidelines for use in preparing the design and other related construction documents for the proposed project. The scope of services included drilling a soil boring, performing laboratory testing, and preparing this geotechnical engineering report.

This report briefly outlines the available project information, describes the site and subsurface conditions, and presents the following:

- General site development and subgrade preparation recommendations.
- Estimated potential soil movements associated with collapsing, shrinking and swelling soils and methods to reduce these movements to approximately 1 inch and ½ inch.
- Recommendations for site excavation, fill compaction, and the use of on-site and imported fill material under pavement and the structures.
- Recommendations for building pad preparation for ground-supported slabs having a maximum movement potential, due to heave or settlement, of 1 inch and ½ inch.
- Drilled pier design criteria for the Press Box, including allowable end bearing and skin friction values, as well as LPILE design values for lateral load analysis for a drilled pier type foundation.
- Recommendations for the design of foundations for supporting the proposed buildings, which includes Wire Reinforcing Institute (WRI) and Post-Tensioning Institute (PTI) design criteria for slab-on-grade foundations designed for a 1-inch potential vertical movement.
- Recommendations for design of shallow continuous footings and spread footings designed for a ½-inch potential vertical movement.
- Seismic design site classification per the 2018 International Building Code.

The scope of services for this geotechnical exploration did not include an environmental, mold nor detailed seismic/fault assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air on or below, or around this site. Statements in this report or on the boring log regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 SITE DESCRIPTION

The following table provides a generalized description of the existing site conditions based on visual observations during the field activities, as well as other available information.

TABLE 2.1: SITE DESCRIPTION

Site Location	4205 Wildcat Drive, Corpus Christi, Texas GPS: Latitude: 27.858°; Longitude: -97.638°
Site History	Existing High School Stadium Facility
Existing Site Ground Cover	Asphalt Pavement and Exposed Soil & Grass
Existing Site Features	Flat
Existing Grade/Elevation Changes	Flat
Site Geology (Geological Atlas of Texas)	Beaumont Formation (Qbc)
Site Soils (USDA)	Victoria clay, 0 to 1 percent slopes (VcA)
Description of Adjacent Property	North: School Building East: Parking Lot and School buildings South: Northwest Boulevard West: Parking Lot
Ground Surface Soil Support Capability	Firm Enough for Field Equipment During Dry Periods

2.2 FIELD EXPLORATION

Field exploration for the project consisted of drilling **four (4)** boring. The boring design element, boring label, approximate depth and drilling footage are provided in the following table.

TABLE 2.2: FIELD EXPLORATION SUMMARY

Design Element	Boring Labels	Boring Depth (ft)	Drilling Footage (feet)
Concession Buildings (B1 & B2)	2	20	40
Press Box (B3 & B4)	2	30	60
TOTAL:	**4**	**---**	**100**

The boring location was selected by PSI personnel and located in the field using a recreational-grade GPS system. The elevation of the ground surface at the boring location was not provided and should be surveyed by others prior to construction, if required. We have estimated ground surface elevation at the boring location from Google Earth. The reference to elevations of various subsurface strata are based on depths below existing grade at the time of drilling. The approximate boring location is depicted on the Boring Location Plan provided in the Appendix.

TABLE 2.3: FIELD EXPLORATION DESCRIPTION

Drilling Equipment	Truck-Mounted Drilling Equipment
Drilling Method	Continuous-Flight Augers
Field Testing	Hand Penetrometer Standard Penetration Test (ASTM D1586)
Sampling Procedure	ASTM D1587/1586
Sampling Frequency	Continuously to a Depth of 10 feet and at 5-foot Intervals Thereafter
Frequency of Groundwater Level Measurements	During and After Drilling
Boring Backfill Procedures	Soil Cuttings
Sample Preservation and Transportation Procedure	General Accordance with ASTM D4220

During field activities, the encountered subsurface conditions were observed, logged, and visually classified (in general accordance with ASTM D2487). Field notes were maintained to summarize soil types and descriptions, water levels, changes in subsurface conditions, and drilling conditions.

2.3 LABORATORY TESTING PROGRAM

PSI supplemented the field exploration with a laboratory testing program to determine additional engineering characteristics of the subsurface soils encountered. The laboratory testing program included:

TABLE 2.4: LABORATORY TESTING PROGRAM

Laboratory Test	Procedure Specification
Visual Classification	ASTM D2488
Moisture Content	ASTM D2216
Atterberg Limits	ASTM D4318
Material Finer than No. 200 Sieve	ASTM D1140

The laboratory testing program was conducted in general accordance with applicable ASTM/TxDOT Test Methods. The results of the laboratory tests are provided on the Boring Log in the Appendix. Portions of samples not altered or consumed by laboratory testing will be discarded 60 days from the date shown on this report.

2.4 SITE GEOLOGY

We reviewed the **Corpus Christi Sheet of the Geologic Atlas of Texas** in an effort to determine the geologic setting of the project site and surrounding areas. The Geologic Atlas of Texas was developed by the Bureau of Economic Geology at The University of Texas using aerial photography, data from various oil and gas exploration companies, and very limited ground reconnaissance. Our review indicates that the project site is located at the ***Beaumont Formation (Qb)*** of Quaternary geologic Age. The Corpus Christi Sheet generally describes the *Beaumont Formation* as being mostly clay, silt, sand.

2.5 SUBSURFACE CONDITIONS

The results of the field exploration and laboratory testing have been used to develop a generalized subsurface profile of the project site. The following subsurface descriptions highlight the major subsurface stratification features and material characteristics.

TABLE 2.5: GENERALIZED SUBSURFACE PROFILE TABLE

Top (ft)	Bot. (ft)	Soil Type	ω (%)	LL (%)	PI	-200 Sieve (%)	N	PP
0	18.5	Sandy Lean Clay Fat Clay with Sand	16 – 34	44 – 72	26 – 52	64 – 83	5 – 12	2 – 3.5
18.5	28.5	Silty Sand	11 – 20	NP	NP	18 – 20	13 – 22	--
28.5	30	Clayey Sand	17	32	17	32	--	4 – 4.5

Where: *1. ω = Moisture content*
2. LL= Liquid limit (%)
3. PI = Plasticity Index
4. -#200 Sieve = % Passing the #200 Sieve
5. N = Standard Penetration Test blow count (blows/foot)
6. PP = Pocket Penetrometer

The boring log included in the Appendix should be reviewed for specific information at the boring location. The boring log includes soil descriptions, stratifications, locations of the samples, and field and laboratory test data. The descriptions provided on the log only represent the conditions at the boring location; the stratifications represent the approximate boundaries between subsurface materials. The actual transitions between strata may be more gradual and less distinct. Variations will occur and should be expected across the site.

2.5.1 GROUNDWATER INFORMATION

Water level measurements were performed during drilling and after completion of drilling. Specific information concerning groundwater is noted on the boring log presented in the Appendix of this report. Groundwater **was not** encountered during the field investigation of this site.

Groundwater levels fluctuate seasonally as a function of rainfall, proximity to creeks, rivers and lakes, the infiltration rate of the soil, seasonal and climatic variations and land usage. In relatively pervious soils, such as sandy soils, the indicated depths are a relatively reliable indicator of groundwater levels. In relatively impervious soils, water levels observed in the borings may not provide a reliable indication of groundwater elevations, even after several days. If a detailed water level evaluation is required, observation wells or piezometers should be installed at the site to monitor water levels.

The groundwater levels presented in this report were measured at the time of PSI field activities. The contractor should be prepared to control groundwater, if encountered, during construction.

3.0 GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

3.1 GEOTECHNICAL DISCUSSION

Based upon the information obtained from the soil boring and laboratory testing, the clay soils encountered at this site within the seasonally active zone have a **low to high** potential for expansion. PSI recommends the expansive potential, i.e. Potential Vertical Movement (PVM) of these soils be mitigated to reduce the potential for foundation movements and foundation distress.

An improved foundation pad must be constructed under soil-supported floor slab and foundation elements due to the presence of expansive foundation soils. Several methods are available to reduce the shrink/swell movement. PSI typically recommends excavating unacceptable soils and, after scarifying and moisture conditioning the exposed subgrade, replacement with some of the removed existing excavation soils used as compacted reconditioned fill and finally select fill materials are placed and compacted up to the bottom of the floor slab.

The planned structure may be supported on a shallow soil-supported stiffened beam and slab-on-grade type foundation (Waffle Slab) if the foundation pad is improved to achieve a PVM of 1-inch. Alternatively, the planned structure may be founded on a spread footing and grade beams foundation with a slab-on-grade foundation for an improved building pad of ½-inch PVM. The Press Box may be supported on straight shaft or underreamed drilled piers foundation.

The following design recommendations have been developed based on the previously described project characteristics and subsurface conditions encountered. If there are changes in the project criteria, PSI should be retained to determine if modifications of the recommendations will be required. The findings of such a review is typically presented in a supplemental report. Once final design plans and specifications are available, a general review by PSI is recommended to verify that the earthwork and foundation recommendations are properly interpreted and implemented within the construction documents.

3.2 POTENTIAL VERTICAL MOVEMENT OF EXPANSIVE SOILS

The soils encountered at the soil boring location exhibit a **low** potential for volumetric changes at the Press Box location to a **high** potential for volumetric changes near the Concession Buildings, due to fluctuations in soil moisture content. PSI has conducted laboratory testing on the soils to estimate the expansive soil potential with soil moisture variations. These soil moisture variations are based on historical climate change data for a particular site. Determining the soil potential for shrinking and swelling, combined with historical climate variation, aids the engineer in quantifying the soil movement potential of the soils supporting the floor slab and shallow foundations based on climate variations. Shrink/swell movement procedures using two soil modeling systems, the Post Tensioning Institute's (PTI) "Design of Post-Tensioned Slabs-on-Ground, 3rd Edition" and Texas Department of Transportation (TxDOT) method TEX-124-E, were utilized to approximate the Potential Vertical Movement (PVM) for this location.

The anticipated shrink/swell movement (PVM) is a soil movement estimated in consideration of soil properties and climatic moisture changes at a particular geographic location. Foundations on expansive soils are designed with sufficient stiffness to resist these soil movements to an acceptable magnitude.

3.2.1 SHRINK/SWELL MOVEMENT (PVM) ESTIMATE

Based on laboratory testing results and the TEX-124-E and the PTI methods, the potential vertical movement was estimated to be approximately **1 inch to 3 inches.**

It is not possible to accurately quantify actual soil moisture changes and resulting shrink/swell movements. The PVM *(often referred to as PVR)* and referenced structural movements values provided should not be considered absolute values that could occur in the field, but approximate values based on industry standard practice and experience. Extreme soil moisture variations could occur due to unusual drought severity, leaking water or sewer lines, perched groundwater infiltration, or seasonal springs. Also, soil desiccation from trees located adjacent to or previously underneath the building, downspouts directing roof discharge under the foundation, poor drainage or irrigation line breaks could lead to moisture content changes greater than accounted for from normal climate variations and result in excessive foundation movements.

The unknown factors previously mentioned cannot be determined at the time of the geotechnical study. Therefore, estimated shrink/swell movements are calculated only in consideration of historical climate data related to soil moisture variations. Movements in excess of these assumed variations should be anticipated and regular maintenance should be provided to address these issues throughout the life of the structure.

3.2.2 DESIGN PVM CONSIDERATIONS

Grade-supported floor slabs, foundations and adjacent flatwork should be expected to undergo some vertical movements, including differential, due to the action of expansive soils and possible soil settlement. In this general area, most Owners, Architects, Structural and Geotechnical Engineers consider a value of **1-inch** to be within acceptable movement tolerances for grade-supported floor slabs or foundations. This generally accepted tolerance for movement has been used by PSI in developing the recommendations for preparing the foundation pad for this project.

The amount of movement associated with a PVM magnitude of 1-inch may not be considered acceptable for “operational” or “aesthetic” performance criteria; which occur at less movement than the magnitude of the design PVM, which is based on “structural” considerations. Cracking in the foundation and walls and sticking doors, which require periodic maintenance, will likely occur for foundations designed using an allowable 1-inch PVM. This should be understood by the Owner and Design Team.

PSI recommends that the Owner discuss allowable movement tolerances with the structural engineer, architect, and all other members of the Design Team prior to commencement of the final design to make certain that appropriate movement tolerances are developed and used for this project. If design PVM values other than 1-inch is desired, PSI should be contacted to review and revise the recommendations presented in this report as necessary to meet the project requirements.

3.3 FOUNDATION RECOMMENDATIONS DISCUSSION

Based on information provided to PSI, information obtained during the field operations, results of the laboratory testing, and PSI’s experience with similar projects, recommendations for a:

- Stiffened beam and slab-on-grade foundation with 1” PVM,

- Continuous and Spread footing and grade beam foundation with unstiffened slab-on-grade with a non-expansive site condition (less than ½" PVM) for the concession buildings.

- A straight shaft or underreamed drilled pier foundation system for the Press Box.

If an alternative foundation type is desired, PSI can provide alternative recommendations in a supplemental letter upon request. Building pad improvements to achieve a 1" PVM are provided in the following sections.

3.3.1 Building Pad Earthwork Recommendations

In order to achieve the desired PVM in the building area, building pad improvement should consist of removing the upper soils to the recommended minimum over-excavation depth, proofrolling and compacting the exposed subgrade, placement of Structural General Fill up to the bottom of reconditioned fill (on sloping sites), then placement and compaction of reconditioned removed soils or imported Reconditioned Fill up to the bottom of the select fill and finally compaction of the select fill to finish floor grade. This procedure is outlined in the following sections.

For areas below the Reconditioned Fill zone, Structural General Fill should be placed between the top of the compacted subgrade up to the bottom of the Reconditioned Fill. Reconditioned fill or Select fill could also be used in this zone.

The following illustrations and tables provide general requirements for the installation of a foundation pad that should provide a PVM magnitude of 1 inch or less and ½ inch or less using the *Reconditioning Method.*

Figure 3.1: Reconditioning Method Pad Improvement

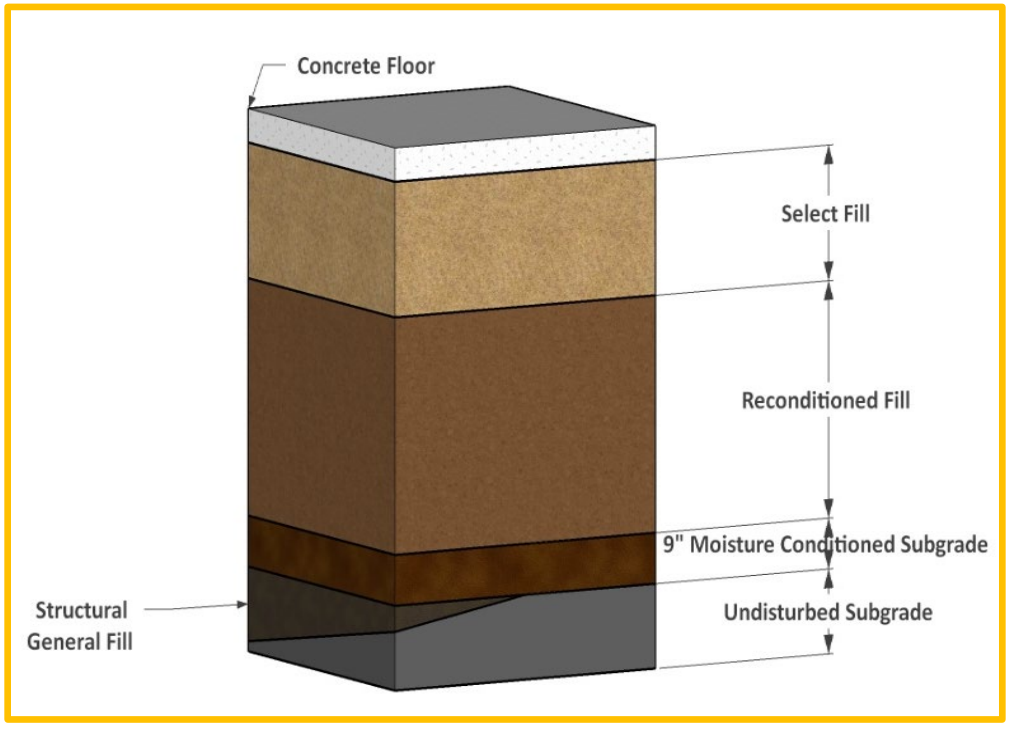


TABLE 3.1: RECONDITIONING METHOD FOR 1" AND ½" PVM

Application	Waffle Slab designed for 1" PVM; Spread footing and Grade Beams
Site Stripping Removal	Upper 6 inches of organics and deleterious material including debris to expose clean subgrade
Foundation Improvement Method	Remove and replace existing soils with reconditioned soil and select fill
Improved Site Condition PVM	1 inch
Minimum Over-Excavation (Assumes FFE within 2 feet of highest existing grade)	**Concession Buildings** PVM 1 inch: **6 feet** PVM ½ inch: **8 feet**
Horizontal Undercut Extent	Below all slab areas and at least 5 feet beyond the slab perimeter and extending the full width of flatwork that may be sensitive to movement
Subgrade Proof-Rolling	Proof-roll subgrade with rubber tired 20-ton (loaded) construction equipment; Alternate Equipment can be used with Geotechnical Engineer Approval; Remove rutting or excessively deflecting soils; Replace failing soils with compacted select fill material
Exposed Subgrade Treatment	Proof-roll then scarify, moisture condition, and compact 9 inches subgrade below base of undercut
Structural General Fill Thickness	As required to achieve the bottom elevation of Moisture Conditioned Subgrade
Structural General Fill Material Requirements	Clean on site or imported materials having: Allowable PI from 12 to 45 Percent Passing No. 200 Sieve > 35% Max Particle Size < 3"
Reconditioned Fill Thickness (min.)	**Concession Buildings** PVM 1 inch: **4 feet** PVM ½ inch: **6 feet**
Reconditioned Fill	On site or imported materials having: Allowable PI from 12 to 40 Percent Passing No. 200 Sieve > 50% Max Particle Size < 3"
On Site Soil Treatment for Reconditioned Fill Use	Possible 1% to 3% lime required to lower on site soil to PI 20 or less
Select Fill Thickness (min.)	PVM 1 inch: **2 feet + as required to achieve bottom of floor slab elevation** PVM ½ inch: **2 feet + as required to achieve bottom of floor slab elevation**
Select Fill Material	TxDOT Item 247 (Crushed Limestone Material) Type A or B Grade 1, 2 or 3
Select Fill Material Alternative (Other low plasticity materials may be used pending review and approval from PSI)	Pit Run - Free of organics, trash, or other deleterious material. Liquid Limit <40% Plasticity Index 7 to 20 Max Particle Size < 3" Percent Material Passing 200 Sieve > 35%
Vapor Retarder Material	Approved by Architect/Structural Engineer
Maximum Loose Lift Thickness	8 inches
Time Between Reconditioned Fill and Select Fill Placement	Less than 4 days

3.3.2 Compaction and Testing Recommendations for Building Pad Areas

The following table outlines building pad compaction recommendations in consideration of appropriate vertical movement reduction method.

Table 3.2: Compaction Recommendations

Location	Material	Density Test Method	Plasticity Index	Percent Compaction	Optimum Moisture Content	Testing Frequency
Building Pad Areas	Subgrade, Reconditioned Fill, Structural General Fill	ASTM D698	PI ≥ 25	94% to 98%	≥ +2%	1 per 5,000 SF; min. 3 per lift
			PI < 25	≥ 95%	0 to +4%	
	Select Fill (Item 247 or Pit Run)	ASTM D698	PI ≤ 20	≥ 95%	-1 to +3%	

3.4 Design Measures to Reduce Changes in Soil Moisture

The following recommended measures can reduce possible moisture fluctuations of the soils under the floor slab. Movements of the foundation soil can be effectively reduced by providing horizontal and/or vertical moisture barriers around the edge of the slab. Typically, moisture barriers consist of concrete flatwork or asphalt or concrete pavement placed adjacent to the edge of the buildings, a clay cap over poly sheeting, and/or a deepened perimeter grade beam or vertical trench filled with flowable fill.

Although subgrade modification is recommended to reduce potential soil-related foundation movements, the design and construction of a grade-supported foundation should also include the following elements:

Roof drainage should be controlled by gutters and carried well away from the structure.

- The ground surface adjacent to the building perimeter should be sloped and maintained a minimum of 5% grade away from the building for 10 feet to result in positive surface flow or drainage away from the building perimeter. In areas adjacent to the building controlled by ADA, concrete flatwork slopes should not be more than 2% within 10 feet of the building.

- Hose bibs, sprinkler heads, and other external water connections should be placed well away from the foundation perimeter such that surface leakage cannot readily infiltrate into the subsurface or compacted fills placed under the proposed foundations and slabs.

- No trees or other vegetation over 6 feet in height shall be planted within 15 feet of the structure unless specifically accounted for in the foundation design.

- Utility bedding should not include gravel near the perimeter of the foundation. Compacted clay or flowable fill trench backfill should be used in lieu of permeable bedding materials between 2 feet inside the building to 4 feet beyond the exterior of the building edge to reduce the potential for water to infiltrate within utility bedding and backfill material.

- Paved areas around the structure are helpful in maintaining soil moisture equilibrium. It will be very beneficial to have pavement, sidewalks or other flatwork located immediately adjacent to the

building to both reduce intrusion of surface water into the more permeable select fill and to reduce soil moisture changes along the exterior portion of the floor due to soil moisture changes from drought, excessive rainfall or irrigation, etc. The use of a clay cap over poly sheeting (horizontal barrier) or impervious geosynthetic liner or concrete (vertical barrier) is recommended in those areas not covered with asphalt or concrete pavement or flatwork.

- Flower beds and planter boxes should be piped or water tight to prevent water infiltration under the building.

- Experience indicates that landscape irrigation is a common source of foundation movement problems and pavement distress. Repairing irrigation lines as soon as possible after leakage commences will benefit foundation performance greatly.

- Building pads and pavement subgrade should be protected and covered within 48 hours to reduce changes in the natural moisture regime from rainfall events or excessive drying from heat and wind.

3.5 FOUNDATION DESIGN RECOMMENDATIONS

The following sections outline geotechnical design recommendations for the foundation options.

3.5.1 STIFFENED BEAM AND SLAB-ON-GROUND FOUNDATION (WAFFLE SLAB) RECOMMENDATIONS

A waffle slab type foundation is generally used to support relatively light structures where soil conditions are relatively uniform and where uplift, and settlement can be tolerated. The intent of a stiffened beam and slab-on-grade foundation is to allow the structure and foundation to move with soil movements while providing sufficient stiffness to limit differential movements within the superstructure to an acceptable magnitude. The foundation may be designed using the Design of Slab-On-Ground Foundations published by the Wire Reinforcement Institute, Inc. (August 1981, updated March 1996). Alternately, the foundation may be designed using the 3rd Edition of the Design of Post-Tensioned Slabs-on-Ground published by the Post-Tensioning Institute (PTI DC10.1-08). The following table is applicable for a conventionally reinforced "Waffle Slab" with subgrade prepared in accordance with Section 3.3.1, which details foundation pad preparation and construction recommendations.

TABLE 3.3: WRI WAFFLE SLAB DESIGN PARAMETERS

Effective Plasticity Index	40
Soil/Climatic Rating Factor (1–C)	0.28
Allowable Bearing Pressure for Grade Beams	1,800 psf
Bearing Stratum at Bottom of Grade Beams	Compacted Select Fill
Minimum Penetration of Perimeter Beams Below Final Exterior Grade	24 inches

PSI is providing PTI design values for the Structural Engineer's design. These design values are estimated from the "Volflo" computer program in consideration of the soil conditions in the building area, an improved building pad having a 1-inch PVM and local experience. The following table is applicable for a conventionally reinforced or post-tensioned slab-on-grade with building prepared in accordance with Section 3.3.1, which details building pad preparation and construction recommendations.

TABLE 3.4: PTI WAFFLE SLAB DESIGN PARAMETERS

Edge Moisture Variation Distance Center Lift, e_m Edge Lift, e_m	 8.3 feet 4.2 feet
Differential Soil Movement Center Lift, y_m Edge Lift, y_m	 -1.26 inches 1.95 inches
Allowable Bearing Pressure for Grade Beams	1,800 psf
Bearing Stratum at Bottom of Grade Beams	Compacted Select Fill
Minimum Penetration of Perimeter Beams Below Final Exterior Grade	24 inches

Utilities that project through slab and grade beam foundations should be designed either with some degree of flexibility or with sleeves in order to prevent damage to these lines as a result of vertical movement. Contraction, control or expansion joints should be designed and placed in interior wall partitions to minimize and control wall cracking as a result of foundation movements. Properly planned placement of these joints will assist in controlling the degree and location of material cracking which normally occurs due to material shrinkage, thermal affects, soil movements and other related factors.

3.5.2 SPREAD FOOTING FOUNDATION RECOMMENDATIONS

As previously mentioned, the concession buildings can be supported by continuous wall footings and isolated spread footings as shown in the illustration and described in the table below:

FIGURE 3.2: SPREAD FOOTING SYSTEMS

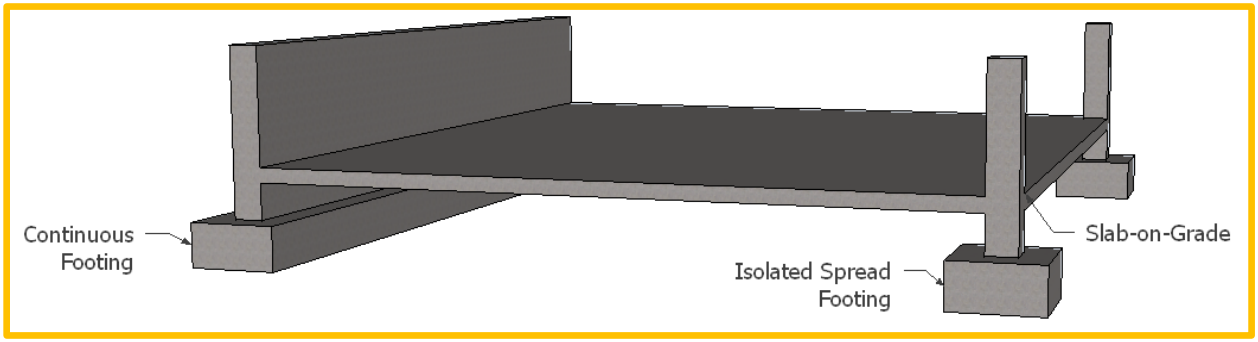


TABLE 3.5: SPREAD FOOTING DESIGN PARAMETERS

Allowable Design Site PVM	Approximately ½ inch
Footing Foundation Depth Range	3 feet below final adjacent grade
Allowable Bearing Pressure	1,800 psf
Factor of Safety	3.0
Approximate Settlement	Less than 1 inch
Sliding Resistance (ultimate)	Utilize a coefficient of friction of 0.35 between the base of the foundation element and underlying material
Passive Resistance (ultimate)	An equivalent fluid weighing 360 pcf may be used to resist lateral forces
Uplift Resistance (ultimate)	Utilize the weight of the foundation concrete and the soil above it. The ultimate uplift resistance can be based on effective unit weights of 110 and 150 pcf for soil and concrete, respectively
Footing Exposed Subgrade Treatment	Free of soft/loose soil, wet materials, and debris. Geotechnical Engineer's representative should observe bearing surface prior to forming footings.

3.5.3 FLOOR SLAB

Floor slabs utilized in conjunction with a spread and strip footing foundation system may consist of a soil-supported floor slab provided the building pad is prepared as recommended in Section 3.3. Consideration should be given to dowelling the floor slab into fixed structural members at doorways, general pathways and other features where differential movements can create trip hazards or other problems. However, by dowelling the floor slab into fixed structural members, it is possible that the floor slab can develop plastic hinge cracks that generally form about 3 to 6 feet away and parallel to the structural member to which the slab is dowelled.

The design of grade-supported floor slab should take into consideration the interaction between the slab and the supporting soils in resisting moments and shears induced by applied loads. Several design methods use the modulus of subgrade reaction, k_1, to account for soil properties in design. The k_1 values presented below are based on a 1 ft by 1 ft bearing area and should be geometrically modified depending on how the slab loads are applied. The subgrade and fill materials beneath the floor slab should be prepared as previously recommended in Section 3.3.

TABLE 3.6: RECOMMENDED K VALUES

Floor Support Material	k, pci
Crushed Limestone Base	225
Pit Run Select Fill	125
Natural Clay Subgrade	75

Utilities that project through slab and foundations should be designed either with some degree of flexibility or with sleeves to help prevent damage to these lines resulting from vertical movement. Contraction, control, or expansion joints should be designed and placed in various portions of the structure to reduce and help control wall cracking resulting from foundation movements. Properly planned placement of these joints will assist in controlling the degree and location of material cracking, which normally occurs due to material shrinkage, thermal effects, soil movements, and other related structural conditions.

ACI 360 should be consulted regarding appropriate vapor barrier selection and placement for grade-supported slabs. Construction joints and reinforcement should be provided to reduce the potential for cracking of the floor slabs due to differential movement. A consistent thickness of select fill for the building pad should be provided so that the floor slabs are uniformly supported.

3.5.4 DRILLED PIER RECOMMENDATIONS

Drilled shafts are recommended foundation system for the proposed Press Box. The axial load carrying capacity of a drilled shaft can be computed using the static method of analysis. According to this method, axial capacity, Q, at a given penetration is taken as the sum of the skin friction on the side of the shaft, Q_f, and the end or point bearing at the shaft tip, Q_{eb}, so that:

$$\mathbf{Q = Q_f + Q_{eb} = f \cdot A_s + q \cdot A_p}$$

where A_s and A_p represent, respectively, the embedded surface area and the end area of the shaft; f and q represent, respectively, the unit skin friction and the unit end or end bearing capacities. The total allowable axial capacity in compression will be the summation of the allowable frictional capacity and the allowable end bearing capacity. The total allowable axial capacity in tension will be the allowable frictional capacity alone neglecting the end bearing component.

3.5.4.1 STRAIGHT SHAFT DRILLED PIERS

PSI recommends that the proposed Press Box be supported on deep straight shaft drilled piers to minimize the potential for undesirable settlement and to reduce potential foundation movements as the structure support will be based below the seasonal active zone. The following figure and tables outline the requirements for drilled shaft design and construction considerations for support of these structures.

FIGURE 3.3: STRAIGHT SHAFT DRILLED PIER

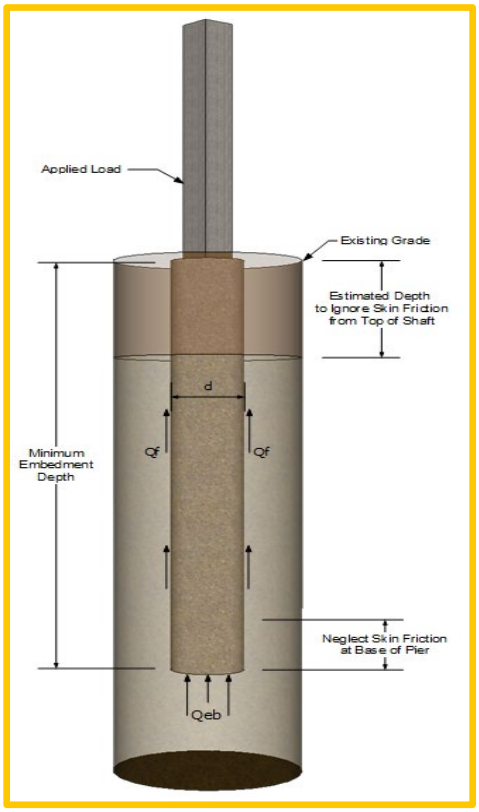


TABLE 3.7: PARAMETERS FOR AXIAL DESIGN

Material	Depth, feet	Allowable Skin Friction, Q_f, psf (F.S. = 2)	Allowable End Bearing, Q_{eb}, psf (F.S. = 3)	Uplift Force of Soil, kips
Sandy Lean Clay	0 to 5	—	—	20d with d in feet
Fat Clay	5 to 18	500	4,500	
Silty/Clayey Sand	18 to 30	700	7,000	

TABLE 3.8: GEOTECHNICAL RECOMMENDATIONS FOR STRAIGHT SHAFT PIER DESIGN

Neglect Skin Friction from Top of Shaft	5 feet
Minimum Embedment Depth Below Original Grade	20 feet
Minimum Shaft Diameter, d	18 inches
Thickness to Neglect Skin Friction at Base of Shaft	1 Shaft Diameter
Uplift Resistance	Pier Weight + Dead Load + Allowable Skin Friction Below Active Zone
Minimum Shaft Spacing (center to center)	3 Shaft Diameters (3·d)
Possible Group Effect	If spacing < 3d consult Geotechnical Engineer
Min. Pier Vertical Reinforcing Steel	Per ACI Code
Estimated Settlement Total Settlement Differential Settlement	 Less than 1 inch Less than 0.5 inch

Notes: Detailed Settlement Analysis is outside of project scope

The minimum embedment depth was selected to locate the pier base below the depth of seasonal moisture change and within a specified desired stratum. Actual pier depths may need to be deeper depending upon the actual compressive loads on the pier.

3.5.4.2 UNDERREAMED DRILLED PIERS

PSI recommends that the proposed Press Box be supported on deep drilled piers to minimize the potential for undesirable movement. The following illustrations and tables outline the requirements for the belled pier design and construction considerations.

FIGURE 3.4: UNDERREAMED DRILLED PIER

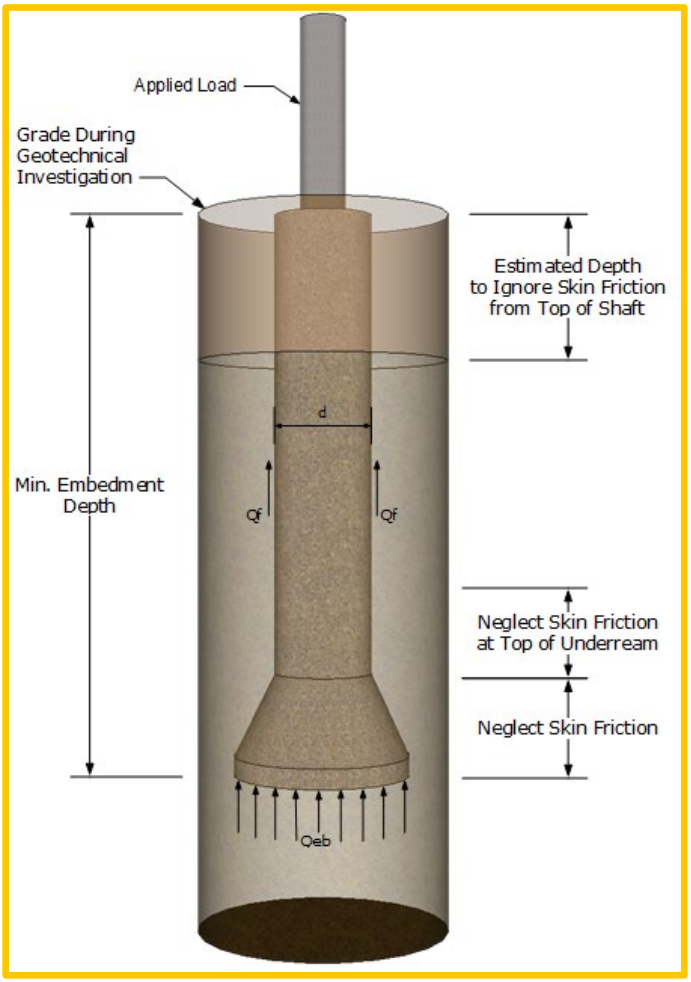


TABLE 3.9: PARAMETERS FOR AXIAL DESIGN

Material	Depth, feet	Allowable Skin Friction, Q_f, psf (F.S. = 2)	Allowable End Bearing, Q_{eb}, psf (F.S. = 3)	Uplift Force of Soil, kips
Sandy Lean Clay	0 to 5	—	—	20d with d in feet
Fat Clay	5 to 18	500	4,500	
Silty/Clayey Sand	18 to 30	700	7,000	

TABLE 3.10: CONSTRAINTS FOR UNDERREAMED PIER DESIGN

Neglect Skin Friction from Top of Shaft	5 feet from top of shaft
Min. Embedment Depth Below Original Grade	20 feet
Min. Shaft Diameter	18 inches
Maximum Bell to Shaft Ratio	2.5
Minimum Thickness to Neglect Skin Friction	Belled Portion and 1 Pier Diameter from Base of Pier
Uplift Resistance	$10 \times (B^2 - D^2)$ *Where: B is base diameter in feet* *D is shaft diameter in feet*
Minimum Shaft Spacing (center-to-center)	3 Shaft Diameters (3*d)
Possible Group Effect	If spacing is less than 3d consult Geotechnical Engineer
Min. Pier Vertical Reinforcing Steel	1% of gross cross-sectional area and as needed to resist uplift forces
Estimated Settlement* Total Settlement Differential Settlement	 Less than 1 inch Less than 0.5 inch

Note: Detailed Settlement Analysis is outside project scope

3.5.4.3 LPILE DESIGN CRITERIA

Piers having lateral loads should be designed utilizing the following LPILE input parameters for this project.

TABLE 3.11: PARAMETERS FOR LATERAL DESIGN USING LPILE

Soil Type	Depth, feet	γ_e, pcf	c, psf	ϕ, Deg.	k_s or k, pci	k_c, pci	ε_{50}
Sandy Lean Clay	0 to 5	105	1000	--	500	200	0.007
Fat Clay	5 to 18	110	1500	--	1000	400	0.005
Silty/Clayey Sand	18 to 30	110	--	30	90	--	--

Note: γ_e: Effective Soil Unit Weight
c: Undrained Cohesion for Clay
ϕ: Friction Angle for Sand
k_s: Clay Static Loading Modulus of Subgrade Reaction
k_c: Clay Cyclic Loading Modulus of Subgrade Reaction
k: Sand Modulus of Subgrade Reaction
ε_{50}: Axial Strain Factor for Soil

3.5.4.4 GENERAL PIER CONSTRUCTION RECOMMENDATIONS

TABLE 3.12: DRILLED PIER INSTALLATION CONSIDERATIONS

Recommended Installation Procedure	FHWA-NHI-10-016, May 2010
High-Torque Drilling Equipment Anticipated	Possible
Groundwater Anticipated	Possible
Verification of Groundwater before Installation	Yes
Temporary Casing Anticipated	Possible, if groundwater is encountered
Concrete Placement after Drilling	Same Day as drilling. If concrete cannot be poured the same day as excavation, temporary casing or slurry may be needed to maintain an open excavation. Concrete should not be allowed to ricochet off the pier reinforcing steel nor off the side walls of excavation.
Concrete Slump	7 inches ± 1 inch
Permissible Water Accumulation in Excavation	Less than 2 inches
Concrete Installation Method for Water Infiltration	Tremie or pump to displace water
Reinforcing and Excavation to Cage Separation	3 times maximum size of coarse aggregate
Centralizers Recommended for Reinforcement	Yes
Cross Bracing within Reinforcement Cage	Not Recommended
Quality Assurance Monitoring by Geotechnical Engineer or Representative	Observe drilling of all piers During drilling, record tip of shaft depth Observe base material and cleanliness of base Observe placement of reinforcement

3.6 SIDEWALKS AND FLATWORK

For sidewalks or other flatwork located adjacent to grade-supported foundations, the undercutting and select fill placement operations for the building should extend beyond the perimeter of the building and pavements to at least the width of the adjacent sidewalk or flatwork. (max. 10 feet)

Other sidewalks or flatwork not adjacent to buildings should be placed on an improved subgrade meeting or exceeding the pavement subgrade improvement methods previously recommended. If the sidewalk subgrade consists of material with a plasticity index of 25 or greater, 12 inches of select fill (recommended in Section 3.3.1) should be placed below the sidewalk. The material should be compacted to 95% or greater than the maximum dry unit weight and contain a moisture content between -1 and +3% optimum moisture content.

Proper drainage around grade-supported sidewalks and flatwork is also very important to reduce potential movements. Elevating the sidewalks where possible and providing rapid, positive drainage away from them will reduce moisture variations within the underlying soils and will therefore provide valuable benefit in reducing the full magnitude of potential movements from being realized.

3.7 SITE SEISMIC DESIGN RECOMMENDATIONS

For the purposes of seismic design, based on the encountered site conditions and local geology, PSI interpreted the subsurface conditions to satisfy the **Site Class D** criteria for use at this site as defined by the International Building Code (IBC). The site class is based on the subsurface conditions encountered at the soil boring, the results of field and laboratory testing, experience with similar projects in this area, and considering the site prepared as recommended herein. The table below provides recommended seismic parameters for the project based on IBC 2018/ASCE 7-16.

TABLE 3.13: RECOMMENDED DESIGN SEISMIC PARAMETERS

Project/Structure Centroid Coordinates (WGS84 - Decimal Degree)	**Latitude: 27.858°; Longitude: -97.638°**
Seismic Parameter	**IBC 2018/ASCE 7-16**
Site Class	D
Risk Category	II
0.2 sec (S_S)	0.064
1.0 sec (S_1)	0.018
Site Coefficient 0.2sec, F_a	1.6
Site Coefficient 1.0 sec, F_v	2.4
0.2 sec (S_{DS})	0.068
1.0 sec (S_{D1})	0.029

4.0 CONSTRUCTION CONSIDERATIONS

Having a Geotechnical Engineer retained to review the earthwork recommendations in the Contract Documents and be an active participant in team meetings near the time of construction can often result in project cost savings. Therefore, PSI recommends that an AASHTO accredited 3rd party laboratory with qualified professional engineers who specialize in geotechnical engineering be retained to provide observation and testing of construction activities involved in the foundations, earthwork, pavements and related activities of this project. As the Geotechnical Engineer of Record (GER), PSI's services can be retained as the 3rd party laboratory. PSI's participation would be advantageous to the project flow and value engineering during construction since we are most familiar with the existing soil conditions at the site.

The geotechnical engineer often does not have available all design information at the time of writing the original report since the report is done very early in the design process. The GER can be of great benefit immediately prior to construction since definitive information regarding the location of the building, surrounding flatwork, pavements, planned landscaping, and drainage features is available at that time. The GER can then write Supplement letters to the original geotechnical report often resulting in less risk and significant project cost savings.

PSI cannot accept responsibility for conditions which deviate from those described in this report, nor for the performance of the foundations or pavements if not engaged to also provide construction observation and materials testing for this project. The PSI geotechnical engineer of record should also be engaged by the Design Team during construction, even if periodic on-call testing is contracted with PSI Construction Services.

4.1 INITIAL SITE PREPARATION CONSIDERATIONS

4.1.1 SUBGRADE PREPARATION FOR SITE WORK OUTSIDE BUILDING PAD AND PAVEMENT AREAS

Grade adjustments outside of the building pad and pavement areas can be made using select or general fill materials. The clean excavated onsite soils may also be reused in areas not sensitive to movement.

TABLE 4.1: SUBGRADE PREPARATION FOR NON-STRUCTURAL - GENERAL FILL

Minimum Undercut Depth	6 inches or as needed to remove roots, organic and/or deleterious materials
Exposed Subgrade Treatment	Proof-roll subgrade with rubber-tired 20-ton (loaded) construction equipment Alternate Equipment can be used with Geotechnical Engineer Approval
Proof-Rolled Pumping and Rutting Areas	Excavate to firmer materials and replace with compacted general or select fill under direction of a representative of the Geotechnical Engineer
General Fill Type	Clean material free of roots, debris and other deleterious material with a maximum particle size of 4 inches
Maximum General Fill Loose Lift Thickness	8 inches

TABLE 4.2: FILL COMPACTION RECOMMENDATIONS OUTSIDE OF BUILDING AND PAVEMENT AREAS

Location	Material	Test Method for Density Determination	Plasticity Index	Percent Compaction	Optimum Moisture Content	Testing Frequency
Outside of Structure / Pavement Areas	General Fill	ASTM D698	PI ≥ 25	94% to 98%	0 to +4%	1 per 10,000 SF; min. 3 per lift
			PI < 25	≥ 95%	0 to +4%	

4.1.2 EXISTING SITE CONDITIONS

The following table outlines construction considerations in consideration of procedures for abandoning old utility lines and removing trees.

TABLE 4.3: CONSIDERATIONS FOR DEMOLITION, ABANDONING UTILITIES AND TREE REMOVAL

Existing Structures	
Foundations of former structures located below new structure	Impact of foundation of former structures should be evaluated on a case by case basis
Foundations for former structures located below new paving	Cut off at least 3 feet below finished paving grade
Existing Pavement	
Former paving located within footing of proposed structures	Remove concrete and/or HMAC surface course and base entirely or review impact on case by case basis
Former paving located within footprint of proposed new paving	Remove concrete and/or HMAC surface course and evaluate if base can be reused
Abandoned Utilities	
Utilities of former structures located within new footprint of proposed structure	Remove pipe, bedding and backfill and then replace with select fill placed using controlled compaction
Utilities of former structures located outside of footprint of proposed structure	Abandon in place using a grout plug
Tree Removal	
Trees located within proposed building footprint; roadways, parking, and sidewalk areas; and within 15 feet of building area	Remove root system for full vertical and lateral extent and extend removal for at least 3 feet beyond presence of root fragments and replace void with compacted general fill or flowable fill

4.2 MOISTURE SENSITIVE SOILS/WEATHER RELATED CONCERNS

Soils are sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils which become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork, foundation, and construction activities during dry weather.

4.3 EXCAVATION OBSERVATIONS

Excavations should be observed by a representative of PSI prior to continuing construction activities in those areas. PSI needs to assess the encountered materials and confirm that site conditions are consistent with those discussed in this report. This is especially important to identify the condition and acceptability of the exposed subgrades under foundations and other structures that are sensitive to movement. Soft or loose soil zones encountered at the bottom of the excavations should be removed to the level of competent soils as directed by the Geotechnical Engineer or their representative. Cavities formed as a result of excavation of soft or loose soil zones should be backfilled with compacted select fill or lean concrete.

After opening, excavations should be observed, and concrete should be placed as quickly as possible to avoid exposure to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond. Excavations left open for more than 48 hours should be protected to reduce evaporation or entry of moisture.

4.4 DRAINAGE CONSIDERATIONS

Water should not be allowed to collect in or adjacent to foundation excavations, on foundation surfaces, or on prepared subgrades within the construction area during or after construction. Proper drainage around grade-supported sidewalks and flatwork is important to reduce potential movements. Excavated areas should be sloped toward one corner to facilitate removal of collected rainwater, groundwater, or surface runoff. Providing rapid, positive drainage away from the building reduces moisture variations within the underlying soils and will aid in reducing the magnitude of potential movements.

4.5 EXCAVATIONS AND TRENCHES

Excavation equipment capabilities and field conditions may vary. Geologic processes are erratic and large variations can occur in small vertical and/or lateral distances. Details regarding “means and methods” to accomplish the work (such as excavation equipment and technique selection) are the sole responsibility of the project contractor. The comments contained in this report are based on small diameter borehole observations. The performance of large excavations may differ as a result of the differences in excavation sizes.

The Occupational Safety and Health Administration (OSHA) Safety and Health Standards (29 CFR Part 1926, Revised October 1989), require that excavations be constructed in accordance with the current OSHA guidelines. Furthermore, the State of Texas requires that detailed plans and specifications meeting OSHA standards be prepared for trench and excavation retention systems used during construction. PSI understands that these regulations are being strictly enforced, and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, State, and Federal safety regulations.

PSI is providing this information as a service to the client. PSI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, State, and Federal safety or other regulations. A trench safety plan was beyond the scope of our services for this project.

5.0 REPORT LIMITATIONS

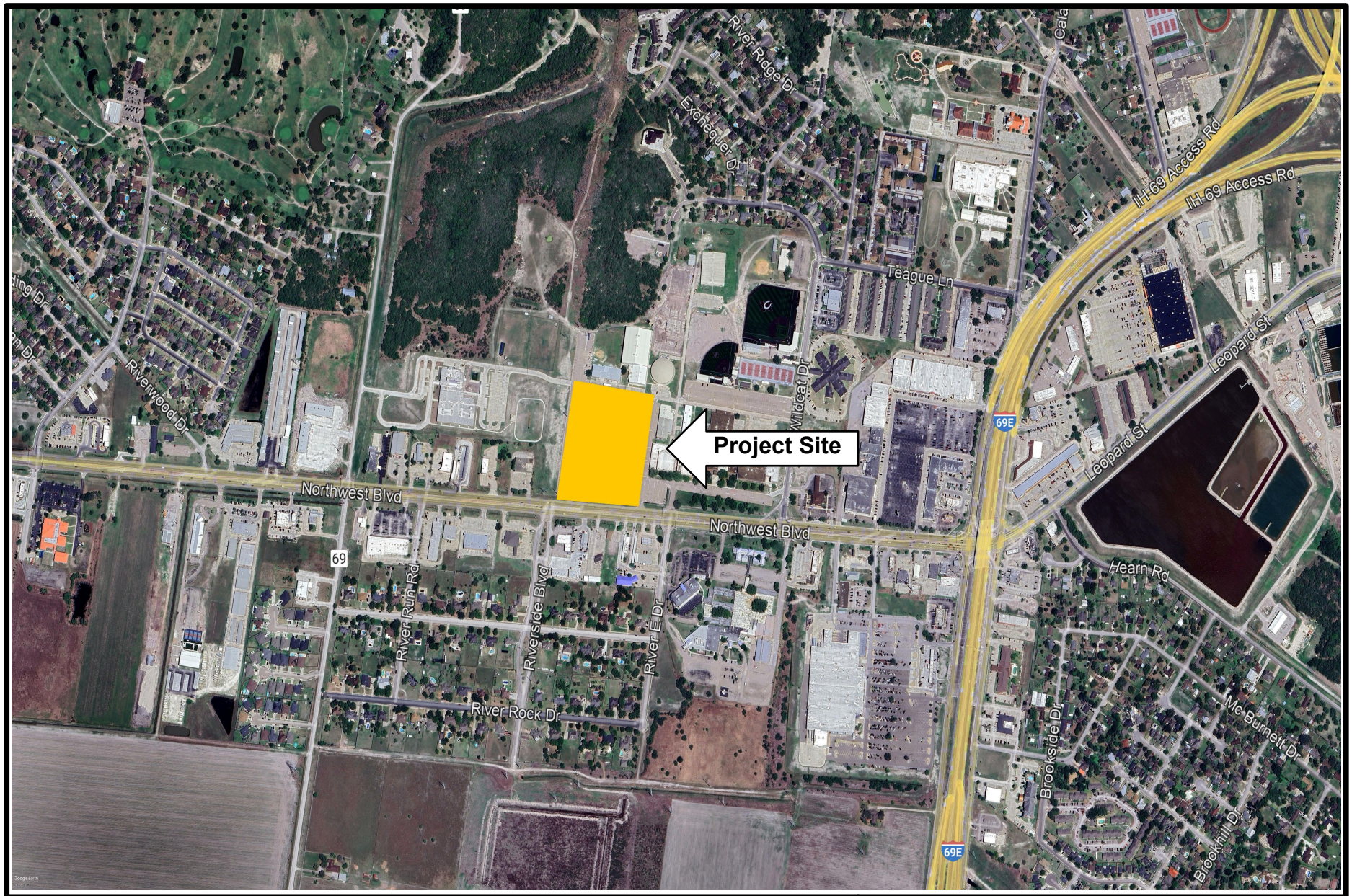
The recommendations submitted in this report are based on the available subsurface information obtained by PSI and design details furnished by the client for the proposed project. If there are revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be notified immediately to determine if changes in the foundation recommendations are required. If PSI is not notified of such changes, PSI will not be responsible for the impact of those changes on the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional Geotechnical Engineering practices in the local area. No other warranties are implied or expressed. This report may not be copied without the expressed written permission of PSI.

After the plans and specifications are more complete, the Geotechnical Engineer should be retained and provided the opportunity to review the final design plans and specifications to check that the engineering recommendations have been properly incorporated in the design documents. At this time, it may be necessary to submit supplementary recommendations. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project.

This report has been prepared for the exclusive use of Calallen ISD for specific application to the proposed Calallen HS Stadium Renovations to be constructed at 4205 Wildcat Drive in Corpus Christi, Texas.

APPENDIX



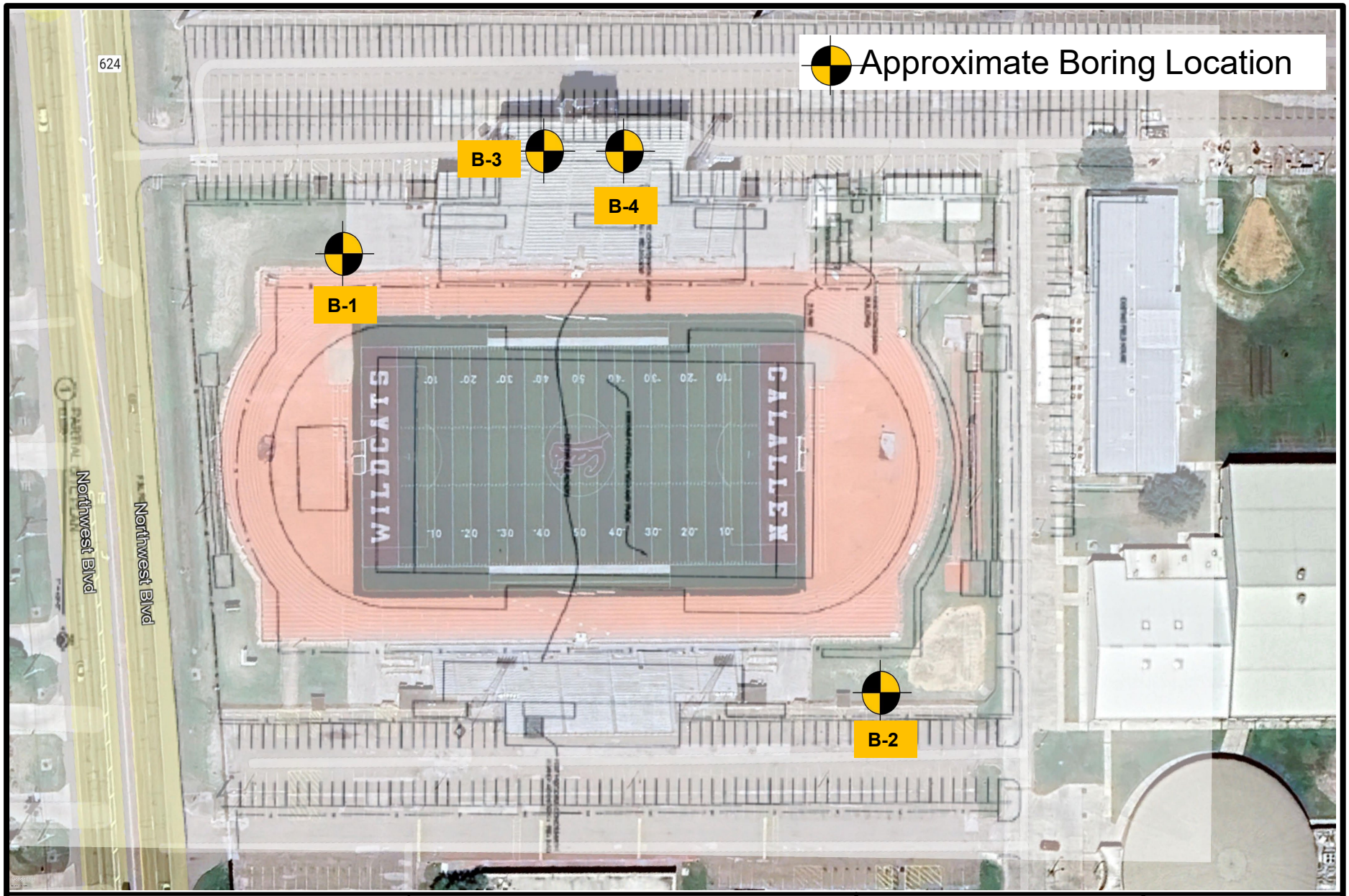
intertek psi
2020 N Loop 499, Ste 302, Harlingen, Texas
(956) 423-6826

Site Vicinity Map

Calallen HS Stadium Improvements
4205 Calallen Wildcat Drive
Corpus Christi, Texas
PSI Project No.: 0312-3551

NOT TO SCALE

N



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(956) 423-6826

Boring Location Plan

Calallen HS Stadium Improvements
4205 Calallen Wildcat Drive
Corpus Christi, Texas
PSI Project No.: 0312-3551

NOT TO SCALE

N

BORING LOGS

Calallen HS Stadium Renovations
4205 Wildcat Drive, Corpus Christi, Texas
Project No. 0312-3551

BORING B-1

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation:											
				FAT CLAY (CH) with SAND, brown, firm to very stiff	21	0	71	5			72	20	52		
					23			9							
5					24	0	76				64	21	43		
					25										
					24										
10															
					24										
15															
				SILTY SAND (SM), tan, medium dense	11	0	20	13			NP	NP	NP		
20				Boring terminated at approximately 20 feet.											
25															
30															
35															

HAND PEN (TSF) ○ UNC CMP (TSF) ●
2.0 4.0 6.0
PL WC LL
20 40 60

COMPLETION DEPTH: 20.0 Feet
DATE: 6/20/25-6/20/25

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

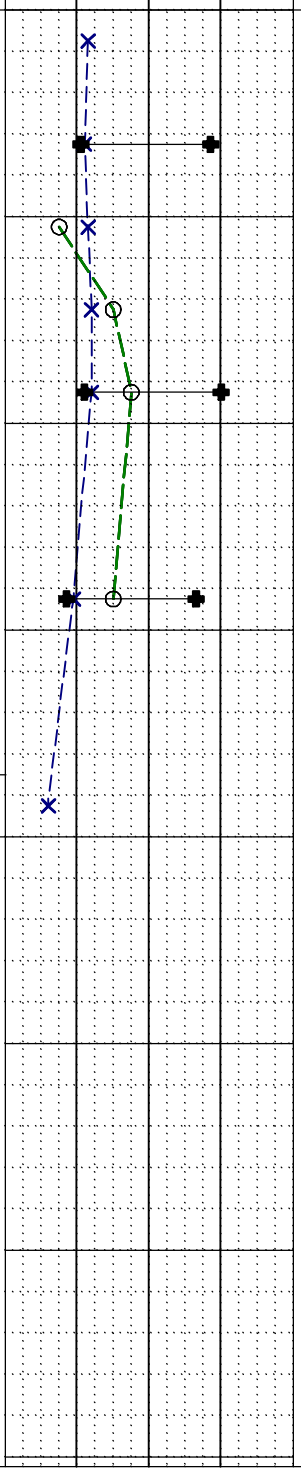
Calallen HS Stadium Renovations
4205 Wildcat Drive, Corpus Christi, Texas
Project No. 0312-3551

BORING B-2

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation:											
				FAT CLAY (CH) with SAND, brown, firm to very stiff	23			5							
					22	0	74	8			57	21	36		
5					23										
					24										
					24	0	83				60	22	38		
10															
				- SANDY at 13.5 feet	19	0	63				53	17	36		
15															
				SILTY SAND (SM), tan, medium dense	12			15							
20				Boring terminated at approximately 20 feet.											
25															
30															
35															

HAND PEN (TSF) ○ UNC CMP (TSF) ●
2.0 4.0 6.0
PL WC LL
20 40 60



COMPLETION DEPTH: 20.0 Feet
DATE: 6/20/25-6/20/25

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Calallen HS Stadium Renovations
4205 Wildcat Drive, Corpus Christi, Texas
Project No. 0312-3551

BORING B-3

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation:											
				SANDY LEAN CLAY (CL), brown, firm to stiff	22	0	64	7			44	18	26		
					23			9							
5				FAT CLAY (CH) with SAND, brown, firm to stiff	25			9							
					25	0	77	8			55	21	34		
10					24			10							
				- transitions to tan at 13.5 feet	28	0	74	10			56	22	34		
15															
20				SILTY SAND (SM), tan, medium dense	17			21							
25					20			16							
				CLAYEY SAND (SC), brown, dense	17										
30				Boring terminated at approximately 30 feet.											
35															

HAND PEN (TSF) ○ UNC CMP (TSF) ●
2.0 4.0 6.0
PL WC LL
20 40 60

COMPLETION DEPTH: 30.0 Feet
DATE: 6/20/25-6/20/25

DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

Calallen HS Stadium Renovations
4205 Wildcat Drive, Corpus Christi, Texas
Project No. 0312-3551

BORING B-4

LOCATION: See Boring Location Plan

DEPTH, FT.	SYMBOL	SAMPLES	WATER	SOIL DESCRIPTION	MOISTURE CONTENT	% RETAINED #4	% PASSING #200	SPT (N) & TCP (T) VALUES	% REC	%RQD	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNCONF. COMP. (TSF)	UNIT DRY WT. (LB/CU FT)
				Elevation:											
				SANDY LEAN CLAY (CL), brown, firm to stiff	34			9							
					16			8							
5				FAT CLAY (CH) with SAND, brown, firm to stiff	26			6							
					25			10							
10					24	0	79	7			58	21	37		
15					26			12							
20				SILTY SAND (SM), tan, medium dense	16	0	18	22			NP	NP	NP		
25					20			18							
				CLAYEY SAND (SC), brown, dense	17	0	47				32	15	17		
30				Boring terminated at approximately 30 feet.											
35															

HAND PEN (TSF) ○ UNC CMP (TSF) ●
2.0 4.0 6.0
PL WC LL
20 40 60

COMPLETION DEPTH: 30.0 Feet
DATE: 6/20/25-6/20/25

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DEPTH TO GROUND WATER
SEEPAGE (ft.): NONE ENCOUNTERED
END OF DRILLING (ft.): NONE ENCOUNTERED
DELAYED WATER LEVEL (FT): N/A

KEY TO TERMS AND SYMBOLS USED ON LOGS

ROCK CLASSIFICATION

RECOVERY

DESCRIPTION OF RECOVERY	% CORE RECOVERY
Incompetent	< 40
Competent	40 TO 70
Fairly Continuous	70 TO 90
Continuous	90 TO 100

ROCK QUALITY DESIGNATION (RQD)

DESCRIPTION OF ROCK QUALITY	RQD
Very Poor (VPo)	0 TO 25
Poor (Po)	25 TO 50
Fair (F)	50 TO 75
Good (Gd)	75 TO 90
Excellent (ExInt)	90 TO 100

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	N-VALUE (Blows/Foot)	SHEAR STRENGTH (tsf)	HAND PEN VALUE (tsf)
Very Soft	0 TO 2	0 TO 0.125	0 TO 0.25
Soft	2 TO 4	0.125 TO 0.25	0.25 TO 0.5
Firm	4 TO 8	0.25 TO 0.5	0.5 TO 1.0
Stiff	8 TO 15	0.5 TO 1.0	1.0 TO 2.0
Very Stiff	15 TO 30	1.0 TO 2.0	2.0 TO 4.0
Hard	>30	>2.0 OR 2.0+	>4.0 OR 4.0+

SOIL DENSITY OR CONSISTENCY

DENSITY (GRANULAR)	CONSISTENCY (COHESIVE)	THD (BLOWS/FT)	FIELD IDENTIFICATION
Very Loose (VLo)	Very Soft (VSo)	0 TO 8	Core (height twice diameter) sags under own weight
Loose (Lo)	Soft (So)	8 TO 20	Core can be pinched or imprinted easily with finger
Slightly Compact (SlCmpt)	Stiff (St)	20 TO 40	Core can be imprinted with considerable pressure
Compact (Cmpt)	Very Stiff (VSt)	40 TO 80	Core can only be imprinted slightly with fingers
Dense (De)	Hard (H)	80 TO 5"/100	Core cannot be imprinted with fingers but can be penetrated with pencil
Very Dense (VDe)	Very Hard (VH)	5"/100 to 0"/100	Core cannot be penetrated with pencil

DEGREE OF PLASTICITY OF COHESIVE SOILS

DEGREE OF PLASTICITY	PLASTICITY INDEX (PI)	SWELL POTENTIAL
None or Slight	0 to 4	None
Low	4 to 20	Low
Medium	20 to 30	Medium
High	30 to 40	High
Very High	>40	Very High

BEDROCK HARDNESS

MORHS' SCALE	CHARACTERISTICS	EXAMPLES	APPROXIMATE THD PEN TEST	
5.5 to 10	Rock will scratch knife	Sandstone, Chert, Schist, Granite, Gneiss, some Limestone	Very Hard (VH)	0" to 2"/100
3 to 5.5	Rock can be scratched with knife blade	Siltstone, Shale, Iron Deposits, most Limestone	Hard (H)	1" to 5"/100
1 to 3	Rock can be scratched with fingernail	Gypsum, Calcite, Evaporites, Chalk, some Shale	Soft (So)	4" to 6"/100

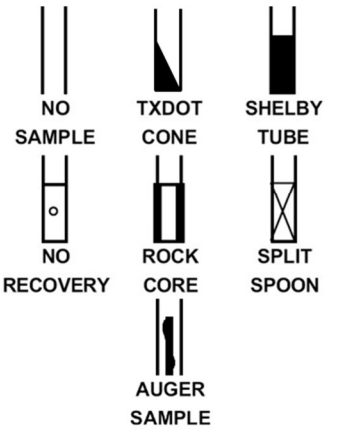
MOISTURE CONDITION OF COHESIVE SOILS

DESCRIPTION	CONDITION
Absence of moisture, dusty, dry to touch	DRY
Damp but no visible water	MOIST
Visible free water	WET

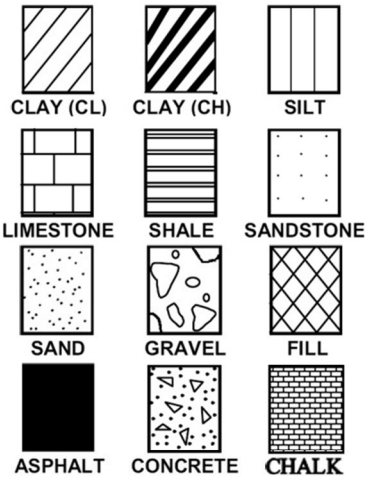
RELATIVE DENSITY FOR GRANULAR SOILS

APPARENT DESNITY	SPT (BLOWS/FT)	CALIFORNIA SAMPLER (BLOWS/FT)	MODIFIED CA. SMAPLER (BLOWS/FT)	RELATIVE DENSITY (%)
Very Loose	0 to 4	0 to 5	0 to 4	0 to 15
Loose	4 to 10	5 to 15	5 to 12	15 to 35
Medium Dense	10 to 30	15 to 40	12 to 35	35 to 65
Dense	30 to 50	40 to 70	35 to 60	65 to 85
Very Dense	>50	>70	>60	85 to 100

SAMPLER TYPES



SOIL TYPES



ABBREVIATIONS

PL – Plastic Limit
LL – Liquid Limit
WC – Percent Moisture

Q_P – Hand Penetrometer
Q_U – Unconfined Compression Test
UU – Unconsolidated Undrained Triaxial

Note: Plot Indicates Shear Strength as Obtained By Above Tests

WATER SEEPAGE

WATER LEVEL AT END OF DRILLING

CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

6"	3"	3/4"	4	10	40	200

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

A COMPLETE BUILDING SOLUTION

Everything you need from start to finish – Assurance, Testing, Inspection, and Certification

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Environmental Consulting & Geotechnical Services

Assuring site and subsurface conditions meet the criteria for purchase, development and construction.

Building Systems Consulting

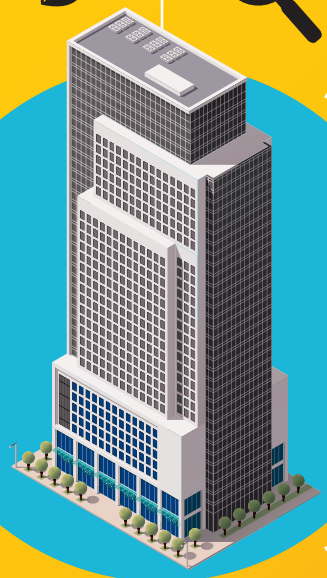
Industry professionals provide a variety of acoustic, fire, AV, roofing system and enclosure consulting services to ensure proper design and installation of a building's critical systems.

Decommissioning & Due Diligence

Supporting the redevelopment and transfer of property assets via environmental and property assessments and engineering services.

Building Product & Construction Materials Testing

Providing testing for virtually all types of building products, construction materials, and systems for safety, retail, code, and performance purposes.



Property Management Support Services

Providing a variety of building systems testing, inspection, and consulting services to optimize the value and life of the property asset.

Product Certification & Code Evaluation

The ETL and Warnock Hersey Marks show a product or system's conformance to code and ensures the on-going verification of compliance.

Mock-Up & Field Testing

On-site (air infiltration, water leakage, and structural performance for fenestration) or in lab validation of a curtain wall's design, workmanship, and material selection to ensure its performance.

Field Labeling

Providing on-site services of opening systems that need to be re-labeled or making recommendations for upgraded materials.

Building Enclosure Commissioning

Design and construction professionals provide solutions to reduce the potential for premature building failure, increase a building's energy efficiency, and expected life cycle.

Industrial Hygiene Services

Assessing a building or facility for a variety of sources (air, asbestos, lead, mold) to minimize the risk of factors adverse to human health.

BCFSNA030-2P

TOTAL QUALITY. ASSURED.

The ever increasing challenges of designing, constructing, and maintaining a building can be difficult for any organization to navigate. From compliance to local and national codes, to ensuring an efficient design, to property management, Intertek-PSI's team of architects, engineers, scientists, and technicians understand firsthand the complexities of successfully constructing a commercial building. Our full suite of services give us unique insight into all phases of a project. Regardless of the project size or complexity, Intertek-PSI delivers engineering, consulting, and testing services to support site selection, design, construction, and property management.

As a leader in providing comprehensive solutions to industries around the globe, Intertek-PSI prides itself on bringing the expertise and services necessary for our clients to meet all of their needs across their entire operation. **Our Assurance, Testing, Inspection, and Certification (A.T.I.C.)** suite of services ensures that whatever your needs may be – assurance, testing, inspection, certification, or all of the above, that those needs will be met by Intertek-PSI.

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A diverse range of services from geotechnical investigations, due diligence, industrial hygiene, and site surveys, for your building environment.

Design Phase
Our expertise offers engineering, consulting, evaluation, and peer review to ensure a well designed project.

Building Product & Construction Materials
The most comprehensive suite of testing and certification services for construction materials and building products.

Construction Project
Vital services throughout the construction process including inspection, testing, monitoring, mock-ups, and consulting.

Building Maintenance
Evaluation of a building's condition through inspection and testing, investigation, and remediation plan development.

Decommissioning & Transfer
Services that expedite and ensure compliance of the transfer or decommissioning of property or building.

SECTION 02 37 60 - DRILLED FOOTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Information concerning a sub-surface soil investigation by an independent testing laboratory is available and will be furnished by the Owner upon request. The data included therein may be used by the contractor for his general information only. The Architect/Engineer will not be responsible for the accuracy or applicability of the data therein.

1.2 SCOPE OF WORK

A. The Drilling Contractor shall furnish all labor, materials, services, equipment (including temporary casings where required) and shall install all piers at the locations and depths shown on the drawings or as otherwise directed by the Owner's Geotechnical Engineer.

B. The Drilling Contractor shall furnish and place all reinforcing steel, dowels, and anchor bolts as shown on the drawings.

C. The General Contractor shall provide all necessary excavation, sheeting and bracing or other adequate maintenance of excavation banks, suitable runways and ramps as necessary for access of pier drilling, control of ground and surface water as necessary to keep the work area sufficiently dry, suitable access roads for movement of equipment and materials to and from pier locations, field layout required for pier work including setting and maintaining a location stake for each pier and giving cut-off grades on all piers, removal and replacement of all overhead and underground obstructions as required, and coordination of all concrete ordering and delivery.

1.3 QUALIFICATIONS

Drilled piers shall be installed by a specialty Drilling Contractor with suitable equipment, competent personnel, and a reputation of satisfactorily performing the work. The Contractor shall have a minimum of 5 years successful experience and a minimum of 5 successful installations on projects of a similar size and scope to this project. Evidence of compliance with this section shall be submitted to the Architect/Engineer prior to entering into a contract for the work.

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1.4 QUALITY ASSURANCE

The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.

A. Codes and Specifications:

The Drilling Contractor shall comply with all provisions of the following specifications:

1. "Standard Specification for End Bearing Drilled Piers", ACI 336.1, as published by the American Concrete Institute.

2. "Standards and Specifications for the Foundation Drilling Industry", as published by the Association of Drilled Shaft Contractors.

In addition, all applicable building code and local regulations shall be followed. In case of conflict, the strictest interpretation shall govern.

B. Survey Work:

1. The General Contractor shall employ a qualified surveyor to perform all surveys, layouts and measurements for drilled pier work. The surveyor shall conduct the layout work for each drilled pier to the lines and levels required prior to beginning excavation and shall make actual in-place measurements of each drilled pier plan location, shaft diameter, bottom and top elevations and deviations from specified tolerances.

2. The surveyor shall record and submit all information pertinent to each drilled pier and cooperate with other testing and inspection personnel to provide data for all required reports.

C. Testing Laboratory Requirements:

The Drilling Contractor shall cooperate with all testing and inspection personnel employed to perform field quality control tests and inspections. See Testing Laboratory section of the specifications for required tests and inspections to be performed by the Testing Laboratory and Geotechnical Engineer.

Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

1.5 JOB CONDITIONS

A. Site Information:

1. Data on indicated subsurface conditions are not intended as representations or warranties of continuity of such conditions. It is expressly understood that Owner will not be responsible for

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interpretations or conclusions drawn therefrom by the Contractor. The data are made available for the convenience of the Contractor.

2. Additional test borings and other exploratory operations may be made by the Contractor at no additional cost to the Owner.

3. Contact Engineer immediately, if after demolition of existing building foundation, existing piers are found to conflict with new pier locations.

B. Protection of Existing Structures:

Protect structures, underground utilities and other construction from damage caused by drilling operations.

C. Survey of Existing Structures:

Record and report to Architect/Engineer surveyed elevation bench marks on structures where directed by Architect/Engineer before commencing work, when structures are adjacent to drilling operations. Record and report elevation of each bench mark at least twice a day while drilling is in progress. Should bench mark readings indicate displacement, halt drilling operations until corrective action has been provided and is acceptable to Architect/Engineer and Owner.

1.6 SUBMITTALS

A. Concrete Mix Design:

Submit concrete mix designs suitable for method of concrete placement for Engineer and Testing Laboratory approval prior to pier installation.

B. Drilling Records:

The Drilling Contractor and the Owner's Geotechnical Engineer or other authorized inspector shall each submit copies of the drilling record for each pier to the Architect/Engineer immediately after drilling. The reports shall indicate the name of the job, name of Drilling Contractor, and name of drilling superintendent. For each pier installed, the report shall indicate the following information:

1. Pier number and location
2. Pier shaft diameter
3. Bottom elevation
4. Top elevation
5. Pier length
6. Theoretical volume of concrete in pier
7. Actual volume of concrete placed
8. Reinforcing steel size and depth actually placed
9. Drilling start and finish time
10. Concreting start and finish time
11. Variation from specified tolerances including location and plumbness
12. Construction method (dry method or casing method)

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13. Groundwater conditions (rate of water infiltration and depth of water in hole prior to concreting for dry piers; water elevation in hole for wet piers)
14. Description and elevation of any obstructions encountered and whether removal was obtained
15. Description of pier bottom including amount and extent of loose material
16. Method of concrete placement
17. Any difficulties encountered in drilling or concreting operations
18. Any deviations from specifications

Reports prepared by the Owner's Geotechnical Engineer or authorized inspector shall be compiled and signed by a registered Texas professional engineer. Reports prepared by the Drilling Contractor shall be compiled and signed by the drilling superintendent.

C. Shop Drawings:

1. Reinforcing Steel:

Submit shop drawings for all drilled pier reinforcing steel.

2. Installation Method:

Submit detailed procedures of the installation method, including (where applicable) type and number of drilling rigs and equipment, casing size and length, casing removal method, drilling fluid type, dewatering method, concrete placement, and reinforcing steel securing and placement.

D. Post Construction Survey:

After completion of pier construction, the Contractor shall provide the Architect/Engineer with an as-built survey showing the actual locations of the piers at cut-off elevations. This survey shall show the plumbness of vertical piers and all abandoned piers and their replacements. No construction of superstructures shall commence until this survey has been reviewed and accepted by the Architect/Engineer. In order to facilitate the progress of the Work, the Contractor shall submit partial pier surveys for approval as the Work proceeds.

PART 2 - PRODUCTS

2.1 CONCRETE

Concrete shall be as specified in the "Cast-in-Place Concrete" section of the specifications and on the drawings, with the additional requirements specified below:

A. Maximum Aggregate Size:

Provide maximum aggregate size of three quarters of minimum clear spacing between individual reinforcing bars or bundles of bars, with 1-1/2 inch maximum.

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B. Air Entraining Admixture:

Use air entraining admixtures in concrete at manufacturers prescribed rate to result in concrete at point of placement having 4% to 6% air content.

C. Water Reducing Admixtures:

Where required by mix design, use water reducing admixtures in strict compliance with manufacturers directions. Admixtures to increase cement dispersion, or provide increased workability for low-slump concrete may be used at contractor's option. Use admixtures in the amounts as recommended by manufacturer for climatic conditions prevailing at time of placing concrete. Adjust quantities of admixtures as required to maintain quality control.

D. Slump Limits:

Proportion concrete to have a slump that is suitable for the placement process used. Provide a minimum 7-inch slump concrete with retarder for cased piers at time of pulling casing.

2.2 REINFORCING STEEL

See "Concrete Reinforcing Steel" section of the specifications.

2.3 STEEL CASING

A. Steel casing shall conform to ASTM A 252, Grade 2 or A 36.

2.04 CONCRETE MIXING

A. Ready Mix Concrete:

Comply with the requirements of ASTM C94.

B. Hot Weather Concreting:

The maximum acceptable concrete temperature at the truck discharge point shall be 95°F. Refer to Hot Weather Concreting Practices specified in "Cast-in-Place Concrete" section of the specifications for required hot weather concreting practices.

C. Cold Weather Concreting Practices:

Concrete should not be placed on any day when the outside air temperature is 40°F or less and falling unless cold weather concreting practices are followed as specified in the "Cast-in-Place Concrete" section of the specifications.

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PART 3 - EXECUTION

3.1 EXCAVATION

A. Requirements:

Excavate holes for drilled piers to the required bearing strata or elevation as shown on the drawings unless directed otherwise in the field by the Owner's Geotechnical Engineer. Excavate holes for closely spaced piers and those

occurring in fragile or sand stratas only after adjacent holes are filled with concrete and allowed to set a minimum of 6 hours or longer as required for concrete to harden.

Drilled pier design dimensions and depths shown on the drawings shall be considered minimums. The design of drilled piers is based on bearing in assumed strata. If bearing stratum is not capable of maintaining capacity assumed, foundation system shall be revised as directed by the Owner's Geotechnical Engineer and Architect/Engineer. Revisions will be paid for in accordance with contract conditions relative to changes in the work.

B. Equipment:

1. Provide adequate equipment so work is expedited to the fullest extent possible. Use equipment fully capable of excavating shafts to depths, diameters, and sizes indicated, and within the specified tolerances. Maintain equipment in satisfactory operating condition and provide sufficient quantity of equipment to maintain the projected schedule of the Work.

2. Using bits or augers with a power-driven rotary-type rig, a shaft of a diameter specified on the drawings shall be excavated from the ground surface to a depth as specified on the drawings or as ordered by the Owner's Geotechnical Engineer.

C. Obstructions:

1. If rocks, boulders, or other unforeseen obstructions are encountered which cannot be removed by standard drilled pier excavation methods, and if such obstructions are not indicated by available sub-surface data, removal of such obstructions will be paid for in accordance with the terms of the Contract relative to changes in the Work.

2. Remove such obstructions by hand labor using air-powered tools or by other safe methods recognized in the construction industry. Standard drilled pier excavation methods include the use of core barrels with pier drilling equipment.

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3. The work of this Section includes demolition and removal of rock, boulders, concrete, masonry, and other subsurface obstructions which are indicated by the Contract Documents, or by the available subsurface

exploration data, and such work will not be considered a change in the Work.

D. Overexcavation:

No payment will be made for extra length of drilled piers when they are installed to a greater depth than required or as authorized by the Owner's Geotechnical Engineer. Overexcavated drilled piers will be measured and paid for in accordance with the original design or authorized depth.

E. Excavated Material:

1. Remove excavated material and dispose of it off site.

3.2 DRILLING METHOD

The following drilling methods may be considered for use on this project:

A. Dry Method:

The excavation shall be made using bits or augers without the use of water or drilling mud. Unless rock or obstructions are encountered, the excavation shall be completed in a continuous operation and the concrete shall be placed immediately prior to completing the day's work.

When casing conditions are encountered or where excess water begins seeping into the hole at a rate greater than 1/4 inch rise per minute in the bottom of the shaft, no further drilling will be allowed until the Drilling Contractor selects a method of placement to prevent ground movement and/or water flow.

B. Casing Method:

Where caving conditions are encountered or excess water seeps into the excavation greater than acceptable for a dry pier as specified above, the Drilling Contractor shall use a temporary casing placed by an appropriate means.

The casing shall be sealed in a stratum of soil that will not cave or admit excessive water. The pier excavation shall then be completed in the approved soil stratum. Vibratory methods of casing placement and removal shall not damage surrounding structures or previously placed piers.

C. Dewatering Method:

When ground water conditions are encountered such that a temporary casing can not be installed in an impervious stratum to cut off water infiltration, a dewatering system shall be installed which will permit proper excavation, inspection, and concreting of the shaft.

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Should the dewatering system employed involve pumping inside the pier, extreme caution shall be used to prevent an unbalanced water head from causing a "blowout", bottom heave, or "quick" condition that could disturb the proposed bearing stratum or surrounding soil strata.

The dewatering method shall be submitted for review and approval of the Owner's Geotechnical Engineer.

The Drilling Contractor's bid price shall include installation of all drilled piers as shown on the drawings by whatever method is required to obtain the final result intended.

3.3 CONSTRUCTION TOLERANCES

A. Plan Location:

The tolerance on plan location for the top of the drilled pier shall not be more than 1/24 of the pier diameter or 3" in any direction, whichever is less.

B. Plumbness:

Permissible tolerance for plumbness shall be 1.0% of the length, 12.5% of the shaft diameter, or 15" at the bottom, whichever is less.

C. Bottom Area:

The bottom of the pier shall be essentially horizontal with the area of the bottom bearing not less than 98% of that specified on the drawings.

D. Top Area:

The Contractor shall remove excess concrete at the top of the pier beyond the limits of the pier diameter. The pier top diameter shall be the same diameter as the shaft below. Piers extending above the ground surface shall be formed.

E. Concrete Cut-Off Elevation:

Concrete cut-off elevation at the pier top shall be plus one inch to minus three inches.

F. If any of the above tolerances are exceeded, the Engineer shall immediately be notified to evaluate the eccentricity in the pier and recommend corrective measures. The cost of
re-engineering and corrective construction shall be borne by the Contractor.

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3.4 INFILTRATION OF GROUNDWATER

A. Dry Pier:

Water rise at a rate of less than 1/4 inch per minute at the bottom of the pier shall be considered a dry pier and concrete may be placed by buckets, chutes, or trunks in such a manner so as not to cause segregation. The total height of water in the bottom of the pier shall not exceed two inches at the time of concrete placement.

B. Wet Pier:

Infiltration of groundwater exceeding 1/4 inch per minute at the bottom of the shaft shall be considered a wet pier and concrete shall be placed by an approved tremie method.

C. Dewatering:

Provide and maintain pumping equipment to keep excavations free of water before placing concrete. If excessive water is encountered and drilling operations must be halted, consult with Architect/Engineer before using alternate methods of construction. Conduct water to general site run-off ditches and disposal areas with discharge lines. Provide ditching as required to conduct water to site drainage facilities.

3.5 TEMPORARY STEEL CASINGS

A. Requirement:

Temporary casings will be required at locations where the soil will not stand without support or where, because of ground water subsurface conditions, sloughing of the sides of shafts may seriously delay or endanger the satisfactory completion of excavation and placement of concrete. The Contractor shall have immediately available for use on the job an ample supply of casing for each size which will be required for use in the shafts and shall provide additional amounts, if required, to ensure orderly progress of the job. Such casing may be in short pieces but with jointing devices of sufficient strength that assembled sections of casing may be pulled complete as concrete is placed, or immediately thereafter. Provide casing of sufficient strength to withstand handling stresses, concrete pressure, and surrounding earth and/or fluid pressures. Make diameter of excavation in relation to diameter of casing such as to create a minimum of void space outside of casing. Provide casing with a minimum outside diameter equal to nominal outside diameter of drilled foundations.

B. All temporary casing shall be removed from shafts as concrete is placed or immediately thereafter, and in such a manner as to prevent sloughing material from dropping to the bottoms of shafts or falling on top of freshly placed concrete.

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3.6 REINFORCING STEEL PLACEMENT

A. Before placing, clean reinforcing steel and dowels of loose rust, scale, dirt, grease and other material which could reduce or destroy bond.

B. Fabricate and erect reinforcing cages in shafts as one continuous unit using inner ring reinforcing guide. Place reinforcement accurately and symmetrically about axis of hole and hold securely in position during concrete placement. The Contractor shall verify depths of drilled piers prior to cutting and tying reinforcing steel cages. Reinforcing steel shall be delivered to the site in standard 60 foot lengths and cut as required. Splice no more than 50% of the bars at any one location alternating spliced and unspliced bars in a symmetrical pattern. Splices

shall be 30 bar diameter compression splices for bars #11 and smaller unless noted otherwise on the drawings. See drawings for additional splice information. The Contractor shall be responsible for adding additional reinforcing steel ties or spirals as required to ensure stability of cage and maintenance of shape and configuration as required for proper lifting, handling, and placement.

C. Use templates to set anchor bolts, leveling plates and other accessories furnished under work of other sections. Provide spacers (capable of sliding on any temporary casings required), blocking and holding devices to maintain required position during concrete placement.

D. The General Contractor shall protect exposed ends of dowels and anchor bolts from mechanical damage and exposure to weather by wrapping and taping with polyethylene or other suitable material.

3.7 CONCRETE PLACEMENT

A. General:

1. Fill drilled piers with concrete immediately after inspection and approval by the Geotechnical Engineer or other authorized inspector. Use protection sheets (cut out to receive concrete) over excavation openings, extending at least 12" beyond edge.

2. Place concrete continuously and in a smooth flow without segregating the mixed materials. Provide mechanical vibration for consolidation of at least top five feet of each shaft but only after any temporary casing is pulled or when casing is permanent.

3. Place concrete by means of bottom discharge bucket, flexible drop chute, elephant trunk hopper, or tremie. Free fall of concrete may be used if provided for in concrete mix design and provided it is directed through a hopper or chute such that fall is down center of shaft without hitting sides or reinforcing steel.

4. Place concrete in-the-dry unless placing underwater is acceptable to Architect/Engineer. If water occurs, and it is impracticable to dewater

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drilled pier excavation, and reasonable attempts to seal off water flow have failed, allow water level to attain its normal level and place concrete by tremie method. Control placement operations to ensure that tremie is not broken during continuous placing from bottom to top. Other methods of depositing concrete underwater may be used, if approved by Architect/Engineer.

5. Maintain a sufficient head of concrete to prevent reduction in diameter of drilled pier shaft by earth pressure and to prevent extraneous material from mixing with fresh concrete. Coordinate withdrawal of temporary casings with concrete placement operations to maintain a head of concrete approximately five feet above casing bottom. During casing extraction upward movement of the reinforcing steel should not exceed 6". Downward movement should not exceed 6" per 20 feet of shaft

   length. When casing is left in place, fill void space between casing and shaft excavation with fluid grout by means of grout pipe and pump pressure as required.

6. Casings shall be pulled in a single continuous smooth operation without sudden jerks or impact. No casing shall be vibrated after concrete is installed.

7. Stop concrete placement at cut-off elevation shown, screed level, and apply a scoured, rough finish. Where cut-off elevation is above ground elevation, form top section above grade and extend shaft to required elevation.

8. Interrupted placing operations of over one hour duration will require a cold joint installation as follows. Leave resulting shaft surface approximately level. At resumption of concrete placing, clean off surface laitance, roughen as required, and slush with a 1-to-1 cement grout or commercial bonding agent before remainder of concrete is placed. Intentional cold joints will not be permitted.

9. Concrete shall not be placed in piers located within three center to center shaft diameters of each other until concrete has cured minimum of 6 hours.

B. Hot and Cold Weather Placement: Refer to Part II.

3.8 APPROVAL BY THE GEOTECHNICAL ENGINEER

Approval by the Owner's Geotechnical Engineer is required on all pier installation criteria and his decision and judgment on pier length, rejection of piers, additional piers required, and all other pier installation and capacity questions shall be final.

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3.8 CONTRACT BASIS

A. Basis of Bids:

Bids shall be based on number of drilled piers, design length from top elevation to bottom of shaft (extended through the bell, if applicable), and diameter of shaft and bell, as shown on drawings. The bid price shall include cost for temporary casing of excavation that may be required.

B. Basis for Payment:

Payment for drilled piers will be made on actual net volume of drilled piers in place and accepted. The actual length and shaft diameter, and bell diameter (if applicable) may vary to coincide with elevation where satisfactory bearing strata is encountered, and with actual bearing value of bearing strata determined by testing services, and with stability and characteristics of soil strata. Adjustments will be made on net variation of total quantities, based on design dimensions for shafts.

1. There will be no additional compensation for excavation, concrete fill, reinforcing, casings, or other costs due to unauthorized overexcavating shafts. Overexcavated piers will be measured and paid for in accordance with required design or authorized depth. No payment will be made for rejected drilled piers.

2. Prices quoted shall include full compensation for labor, temporary casing, materials, tools, equipment, and incidentals required for excavation, trimming, shoring, casings, dewatering, reinforcement, concrete, and other items for complete installation.

C. Unit Prices:

Unit prices for the following items, as set forth in contract conditions, will apply in event additions to or deductions from work are required and authorized by written order from Architect/Engineer to Contractor.

Soil excavation (including temporary casing if required)	per cu. yd.
Rock excavation	per cu. yd.
Temporary steel casings, installed	per lin. ft.
Reinforcing steel and dowels, installed	per lb.
Concrete	per cu. yd.

END OF SECTION 02 37 60

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SECTION 02 41 00 –DEMOLITION

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. Provide Asbestos abatement and Demolition of existing buildings, press box, structure, and sitework as required to accommodate new stadium improvements and associated sitework as shown on the drawings or required. Include removal of existing utilities as indicated or encountered; removal of concrete and masonry structures, steel columns and structure, existing walks, curbs, pavements and mechanical, electrical, and plumbing items as indicated or required.

B. Related work specified elsewhere includes relocation of utitlities, pipes, conduits, ducts, and other mechanical and electrical work.

C. The extent of this work is to be determined by site inspection in addition to information given on the drawings and in various sections of the specifications. The drawings contain information regarding square footages of the buildings and general information relative to the construction of these buildings. This information was gathered off of various existing drawings and field verification. As noted on the plans and now restated here, neither the District nor the Architect guarantees or warrants in any way this information. It is the sole responsibility of any and all Contractors or Subcontractors to verify these quantities and building descriptions for themselves prior to submitting their proposal.

D. The Owner will identify or remove any items they wish to retain from the building prior to demolition.

E All elements of the buildings or site elements present or not identified by the Owner at the time of demolition and indicated in the plans to be demolished can be considered by any Contractor submitting a proposal on this project to accrue to that Contractor upon the award and execution of a contract on this project. It is assumed by the Owner that any value of such material will be considered by the Contractor in an effort to reduce the ultimate overall cost to the Owner for demolition and disposal of these buildings.

REQUIREMENTS

A. Site Investigation:
   1. By starting this project, the Contractor acknowledges that he has investigated and satisfied himself as to:
      a. The conditions affecting the work, including but not limited to physical conditions of the site that may bear upon site access, handling and storage of tools and materials, access to water, electric or other utilities that might otherwise affect performance of required activities.
      b. The character and quantity of all surface and subsurface materials or obstacles to be encountered in so far as this information is reasonably ascertainable from an inspection of the site, including exploratory work done by the Owner or Designated Consultant, as well as information presented in drawings and specifications included with this contract.
      c. Federal, State, and local laws and regulations that may affect cost, progress and performance of the work.

SUBMITTALS

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A. General: Submit the following in accordance with Conditions of the Contract and Division 1.
   1. Itemized Demolition Schedule indicating sequence of demolition work for review prior to start of work. Include coordination for shutoff, capping and continuation of utility services as required.
   2. Detail all demolition methods to be used including but not limited to dust and noise control protection.
   3. Photographs of existing conditions of structure, earthwork and utilities.

PERMITS

A. Procure and pay for all necessary permits or certificates required to complete the work specified. Make any and all required notifications and comply with all applicable Federal, State and local ordinances.

QUALITY ASSURANCE

A. Provide at least one (1) person who shall be present and in charge of the Demolition Work at all times and who shall be thoroughly familiar with all phases of all work performed under this Section.

B. Comply with all pertinent codes and regulations applying to this work.

JOB CONDITIONS

A. Use all means necessary to prevent the spread of dust during performance of this work.

B. Use all means necessary to protect the existing areas or structures to remain from all types of damage, including fire, water damage, and unnecessary interruption of utility services. In the event of damage of any kind, immediately make all repairs and replacements necessary to the approval of the Owner at no additional cost to the Owner.

C. Motor driven equipment shall have functional mufflers.

D. Visit the site and examine the existing structures. Note all conditions as to the character and extent of work involved.

GENERAL

A. Provide all barricades, shoring, and bracing necessary to protect the tenants, workmen, and Public from danger. Barricades shall be sufficiently designed to protect and or exclude the public from all hazards.

B. Conduct Demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent facilities. Do not close, block or otherwise obstruct streets or walks without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways as required by the City of Corpus Christi.

C. Maintain existing utilites indicated to remain in service and protect them against damage during demolition. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by the Owner. Provide temporary services during interruptions of existing utitlies as required.

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D. All other materials, not specifically described but required for proper completion of Work of this Section, shall be as selected by the Contractor subject to the approval of the Owner.

ASBESTOS ABATEMENT

A. It is the responsibility of the Demolition Contractor to contract to have all Asbestos containing materials abated prior to any demolition work.

B. A copy of the School District's Asbestos Survey Reports of the Buildings within the Stadium is appended to the end of this document. The results of the Reports indicate that Asbestos is located in the existing Stadium Restroom roofs.

C. Asbestos Program Manager:
An Asbestos Program Manager shall be provided by the Owner to oversee the abatement project and to observe compliance with all contract specifications. The Asbestos Program Manager shall have the authority to stop any job activities not being performed in accordance with applicable regulations or guidelines, or the requirements of this specification, or if work is judged to be improperly or unsafely performed by the Contractor. These shall be reported to the Owner with a description of the activity, the reason for stopping work and alternatives for correcting the problem. No additional time to complete the contract will be granted because of work stoppages.

D. Air Sampling Professional:
An Air Sampling Professional shall be provided by the Owner to conduct all area and clearance air monitoring as required by Federal Regulations and in accordance with NIOSH Method 7400, PCM air monitoring, and aggressive TEM final clearance air monitoring, where applicable. Costs of repeat testing due to the failure of the Contractor to meet the project criteria will be back-charged to the Contractor

DEMOLITION

A. Before commencing the Work of this Section, verify with the Owner that all items to be removed by the Owner have been removed. Schedule the work in a careful manner with all necessary consideration for the Public and the Owner. All items of existing equipment and materials or any other item of value to the Owner shall be salvaged by the Owner prior to demolition.

B. All material removed under this Contract, which is not to be salvaged or reused, shall become the property of the Contractor and be promptly removed from the site. At all times use movable debris boxes, covered, to convey the material through the building. Do not store or permit debris to accumulate on the site. Dumpsters shall not overflow and shall be emptied on a regular basis. Remove all debris from the building premises and leave the construction site "Clean" each day. All debris shall be dumped in an approved disposal facility and all fees for this shall be paid by the Contractor. Contractor is responsible for completely removing all demolished materials from the site and disposing of them in accordance with all local, State and Federal Regulations. If Contractor fails to remove debris promptly, Owner reserves the right to have debris removed at Contractor's expense.

C. Conduct operations so as not to interfere with adjacent occupied spaces, roads, streets, drives, walks, service lines and the like.

D. Keep all pedestrian areas clear for passage at all times.

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PROTECTION OF STRUCTURES, PROPERTY

A. Execute demolition work to ensure adjacent property no damage from falling debris or other causes.

B. Take precautions to guard against movement, settlement, or be liable for such movement, settlement, or collapse; repair promptly such damage when so ordered.

C. Repair damage to Owner's property or any other person or persons on or off premises by reason of required work.

DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from project site debris, rubbish, and other materials resulting from demoltion operations. Transport and legally dispose off of site.

B. All asbestos removed prior to demolition must be handled and disposed of as prescribed in the separate asbestos abatement management plan included in this project manual.

C. All waste from this project must also be handled and legally disposed of in strict accordance with the Solid Waste Disposal Act, Texas Health and Safety Code, Chapter 361, and Title 30, Texas Administrative Code Chapter 335 "Industrial Solid Waste and Municipal Hazardous Waste" administered by the Texas Commission on Environmental Quality. Sanitary or hazardous waste is defined in 40CFR Part 260 and 30 TAC Chapter 335 to include, but not limited to, old light bulbs, lead ballasts, piping, roofing material, discarded equipment, debris, and asbestos. The contractor shall be responsible for identification of all such materials covered under the laws/acts listed above, separation of such items and proper disposal of such items in proper landfills or other complying disposal sites. Contractor shall also be responsible for obtaining and paying for any special permits for hauling and disposal of materials removed under this contract

CLEANUP

A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site and school property. Remove protections and leave areas free of debris.
   1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start of opertations. Repair adjacent construction or surfaces damaged by demolition work.

END OF SECTION 02 41 00

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Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036k, Calallen Stadium Roof Samples
Reference #: CAL25097063AS Date: 09/22/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

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Phone 225-751-5632
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Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036k, Calallen Stadium Roof Samples **CA Labs Project #:** CAL25097063AS

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
84704	036k-2	*2-2*	*white insulation*	***20% Chrysotile***	***white insulation black tar***
84706	036k-4	*4-2*	*white insulation*	***20% Chrysotile***	
84708	036k-6	*6-1*	***Roof Mastic**/ black tar*	***2% Chrysotile***	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

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Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Phone # 361-779-5064
Fax #

Customer Project:
25-036k, Calallen Stadium Roof Samples

Turnaround Time:
8 Hours

CA Labs Project #:
CAL25097063AS

Date: 9/22/2025
Samples Rec'd: 9/22/25 10:30AM
Date Of Sampling: 9/20/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
84703	036k-1		*1-1*	***Built-up Roof**/ black tar and black felt*	*n*	***None Detected***	20% fg	80% qu,bi
84704	036k-2	***4***	*2-1*	***Roof Mastic**/ black tar*				
84704			*2-2*	*white insulation*	*y*	***20% Chrysotile***		80% qu,ca,ma
84705	036k-3		*3-1*	***Built-up Roof**/ black tar*	*y*	***None Detected***		100% qu,bi
84706	036k-4	***4***	*4-1*	***Roof Mastic**/ black tar*				
84706			*4-2*	*white insulation*	*y*	***20% Chrysotile***		80% qu,ca,ma
84707	036k-5		*5-1*	***Built-up Roof**/ black tar*	*y*	***None Detected***		100% qu,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM *TDSHS 30-0235*

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Tomas Vazquez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Polarized Light Asbestiform Materials Characterization

Customer Info:
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Customer Project:
25-036k, Calallen Stadium Roof Samples

Turnaround Time:
8 Hours

CA Labs Project #:
CAL25097063AS

Date: 9/22/2025
Samples Rec'd: 9/22/25 10:30AM
Date Of Sampling: 9/20/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
84708	036k-6		*6-1*	***Roof Mastic**/ black tar*	*y*	***2% Chrysotile***		98% qu,bi
84709	036k-7		*7-1*	***Built-up Roof**/ black tar*	*y*	***None Detected***		100% qu,bi
84710	036k-8		*8-1*	***Roof Mastic**/ black tar and black felt*	*n*	***None Detected***	20% fg	80% qu,bi
84710			*8-2*	*black tar*	*y*	***None Detected***		100% qu,bi
84711	036k-9		*9-1*	***Built-up Roof**/ black tar*	*y*	***None Detected***		100% qu,bi
84712	036k-10		*10-1*	***Roof Mastic**/ black tar*	*y*	***None Detected***		100% qu,bi
84713	036k-11		*11-1*	***Built-up Roof**/ black tar*	*y*	***None Detected***		100% qu,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
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gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

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Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

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2. Fire Damage no significant fiber damages effecting fibrous percentages
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4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Turnaround Time:
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CA Labs Project #:
CAL25097063AS

Date: 9/22/2025
Samples Rec'd: 9/22/25 10:30AM
Date Of Sampling: 9/20/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
84714	036k-12		*12-1*	***Roof Mastic**/ black tar*	*y*	***None Detected***		100% qu,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

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9. < 1% Result point counted positive
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TEXAS CONSULTING SERVICES

*PO Box 610 * Mathis, Texas 78368*

*Phone: (361) 779-5064 * Fax: (432) 687-5456*

Email: stevestrong2a@yahoo.com

September 21, 2025

Project: Athletic Field House
Calallen ISD
Corpus Christi, Texas
Attn: Blair McDavid
Email: bmcdavid@calallen.org
Phone: 361-242-5600

RE: Asbestos Inspection - Press Box
4001 Wildcat Drive,
Corpus Christi, Texas

Mr. McDavid,

A thorough asbestos inspection was conducted at the Football Stadium Press Box located at 4001 Wildcat Drive, Corpus Christi, Texas, on September 16, 2025. The sampling was conducted to allow demolition. Sampling of suspected materials discovered the following asbestos containing materials:

None of the materials observed and sampled were found to contain asbestos

The survey was completed by a Texas Department of State Health Services Licensed Management Planner, Mr. Steve Strong. If you have any questions regarding the information contained in this report, please contact our offices at your earliest convenience: (361) 779-5064.

Inspector Signature:

Sincerely,



Steve Strong

Certified Environmental Health Technician

TX Department of Licensing and Regulation Mold Assessment Consultant #MAC0334

TX Department of State Health Services Asbestos Management Planners' License #205048

TX Department of State Health Services Lead Inspector License #205048

TEXAS CONSULTING SERVICES
PO Box 610 * Mathis, Texas 78368
Phone: (361) 779-5064 * Fax: (432) 687-5456
Email: stevestrong2a@yahoo.com

ASBESTOS SURVEY REPORT FOR:

CLIENT:
Attn: Blair McDavid
Calallen ISD
Corpus Christi, Texas 78401

PROJECT SITE:
Football Stadium
Press Box
4001 Wildcat Drive
Corpus Christi, Texas

INSPECTION DATE:
September 16, 2025
TCS Project No. 25-036a

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TAB 1 – ASBESTOS INSPECTION REPORT

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

TAB 1

ASBESTOS INSPECTION REPORT

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2.0 BUILDING DESCRIPTION

3.0 RESULTS OF SAMPLING FOR ACM

5.0 RECOMMENDATIONS

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TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

ASBESTOS REPORT AND SUMMARY

SCOPE OF ASBESTOS INSPECTION

A. Texas Consulting Services will not be responsible for any asbestos containing materials (ACM) that were not found in the asbestos inspection of the site due to areas that were inaccessible or concealed. Since ACM inspection is limited to areas that are accessible to the inspector and not enclosed or otherwise concealed from the inspection process and additionally that non-destructive testing is performed during the inspection, the owner is advised that abatement or demolition may discover additional ACM on site. Unless stipulated in the project proposal, TCS does not perform exterior sampling for asbestos.

B. This inspection report is written based on the ACM inspection of the site and on the lab analysis of samples taken. The laboratories used are Department of State Health Services licensed and Texas Consulting Services assumes these analyses are true and correct but will not be responsible for their content.

C. Any damages done to the site will be the responsibility of the site owner. Some damage will occur as a part of the inspection process such as, but not limited to, floor tile, holes in walls, surfaces or pipes or other cosmetic damage. Texas Consulting Services will not be responsible for these damages.

D. Theft from the site will not be the responsibility of Texas Consulting Services.

E. This inspection is not a warranty as to the absence of ACM in the completed project.

F. Neither Texas Consulting Services, its employees or representatives have had, presently have, or contemplate having any interest in the subject property or are associated in any way with any party to this project.

1.0 Overview

A limited asbestos survey was performed by Texas Consulting Services on September 16, 2025, at the following project site: Football Stadium Press Box at 4001 Wildcat Drive in Corpus Christi, Texas. Samples were taken of suspected interior materials (See 3.0 Table of Sampling Results).

The onsite structure was surveyed to determine the presence and Locations of ACM, if any, in the structure.

Asbestos in public buildings regulations were adopted under Art 4477-3A, Section 12 of the Texas Civil Statutes with enforcement authority given to the Texas Department of State Health Services.

The new regulations are very restrictive of who may perform asbestos related activities. Building owners or their representatives should make sure that anyone doing asbestos work or consulting is licensed by the Texas Department of Health. All Texas Consulting Services personnel are licensed to perform a variety of asbestos related activities.

2.0 Building Description

The building has a slab foundation, built-up roof over concrete, drywall ceiling in the main wing, and CMU interior/exterior walls.

3.0 Results of Sampling for ACM (Asbestos)

The inspector took 16 bulk asbestos samples, from which the laboratory analyzed 30 layers.

The chart of the samples collected with laboratory results for asbestos being obtained from the samples is below:

Table of Sample Results, Location, Condition, Amount

Athletic Field House
4001 Wildcat Drive
Corpus Christi, Texas

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative	1	036a-1	Drywall Surfaced White Compound	Walls and Ceiling	N/A	G	Misc	F	None
Negative	1	036a-2	Drywall Surfaced White Compound	Walls and Ceiling	N/A	G	Misc	F	None
Negative Negative	1-1 1-2	036a-3-1 036a-3-2	White Joint Compound White Drywall With Brown Paper	Walls and Ceiling	N/A	G	Misc	F	None
Negative Negative	1-1 1-2	036a-4-1 036a-4-2	White Joint Compound White Drywall With Brown Paper	Walls and Ceiling	N/A	G	Misc	F	None
Negative Negative	1-1 1-2	036a-5-1 036a-5-2	White Joint Compound White Drywall With Brown Paper	Walls and Ceiling	N/A	G	Misc	F	None
Negative Negative Negative	2-1 2-2 2-3	036a-6-1 036a-6-2 036-6-3	12” White Floor Tile Tan Mastic 12” White Floor Tile Tan Mastic	Under Carpet	N/A	G	Misc	NF	None
Negative Negative Negative	2-1 2-2 2-3	036a-7-1 036a-7-2 036a-7-3	12” White Floor Tile Tan Mastic 12” White Floor Tile Tan Mastic	Under Carpet	N/A	G	Misc	NF	None
Negative Negative Negative	2-1 2-2 2-3	036a-8-1 036a-8-2 036-a-3	12” White Floor Tile Tan Mastic 12” White Floor Tile Tan Mastic	Under Carpet	N/A	G	Misc	NF	None
Negative Negative	3-1 3-2	036a-9-1 036a-9-2	12” Gray Floor Tile Tan Mastic	Restroom	N/A	G	Misc	NF	None
Negative Negative	3-1 3-2	036a-a0a-1 036a-10a-2	12” White Floor Tile Tan Mastic	Restroom	N/A	G	Misc	NF	None
Negative Negative	3-1 3-2	036a-11a-1 036a-11a-2	12” White Floor Tile Tan Mastic	Restroom	N/A	G	Misc	NF	None
Negative Negative	4-1 4-2	036a-12a-1 036a-12a-3	Gray Baseboard Cove Base Mastic	All Walls	N/A	G	Misc	NF	None
Negative Negative	4-1 4-2	036a-13a-1 036-13a-2	Gray Baseboard Cove Base Mastic	All Walls	N/A	G	Misc	NF	None
Negative Negative	4-1 4-2	036a-14a-1 036a-1a4-2	Gray Baseboard Cove Base Mastic	All Walls	N/A	G	Misc	NF	None
Negative	5	036k-1	Roof Fieldtar	Roof	N/A	G	Misc	NF	None
Negative	6	036k-2	Roof Sealant Tar	Roof	N/A	G	Misc	NF	None

TSI – Thermal System Insulation
Surf – Surfacing
Misc – Miscellaneous
HA – Homogeneous Area

G – Good condition
D – Damaged
S – Significantly damaged

4.0 Sampling and Analysis Protocols

A discreet sample of each suspect ACM was obtained (if warranted) and placed into individual sample containers. Three samples of each homogenous material are required by DSHS regulations. Surfacing materials require 3, 5, or 7 samples according to the square footage present. The locations were noted on the survey form and assigned an individual laboratory identification number. This number was affixed to the sample container as the sample was collected. A survey form was also used to note material type (surfacing, thermal, or misc.), and general condition of the suspect ACM and a map was made to identify locations of samples. Attempts were made to obtain representative samples of like materials as this is the most cost-effective method for the determination of ACM. It should be noted that inspection and bulk sampling of roofing materials and window caulk was included in the scope of inspection. Although Texas Consulting Services used care to obtain bulk samples, it is necessary to take a representative quantity of suspect materials. This results in a certain amount of unavoidable damage to these materials.

During the asbestos survey, the inspector (sampler) wore appropriate respiratory protection when necessary (29CFR. 1910 and 1926, and EPA - 560 OPTS-86-0001, A Guide to Respiratory Protection for the Asbestos Abatement Industry).

Sample analyses were conducted using polarized light microscopy (PLM) with diffusion staining as required by EPA method 600/M4-82-020.

Air sampling, if warranted, was performed using Phase Contrast Microscopic (PCM) as required by NIOSH-582 and NIOSH-7400 Revision 3 (effective 5/15/89).

5.0 Recommendations

No asbestos was identified in any of the samples.

Work may proceed without asbestos concerns.

This survey was conducted by an asbestos management planner accredited & licensed in the State of Texas, Mr. Steve Strong, DSHS License #205048.

TAB 2

LABORATORY RESULTS

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036a, Calallen Stadium Pressbox
Reference #: CAL25096955AG Date: 09/22/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
Dedicated to Quality

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Carrollton, TX 75006
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Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036a, Calallen Stadium Pressbox **CA Labs Project #:** CAL25096955AG

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

CA Labs
Dedicated to Quality

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CA Labs, L.L.C.
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Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036a, Calallen Stadium Pressbox

CA Labs Project #:
CAL25096955AG

Turnaround Time:
3 days

Date: 9/22/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83003	036a-1		1-1	***Drywall, Surfacing**/ white surfaced white compound*	n	***None Detected***		100% qu,bi,ca
83004	036a-2		2-1	***Drywall, Surfacing**/ white surfaced white compound*	n	***None Detected***		100% qu,bi,ca
83005	036a-3		3-1	***Drywall, Surfacing**/ white surfaced white compound*	n	***None Detected***		100% qu,bi,ca
83005			3-2	*white drywall with brown paper*	n	***None Detected***	24% ce	76% qu,gy
83006	036a-4		4-1	***Drywall, Surfacing**/ white surfaced white compound*	n	***None Detected***		100% qu,bi,ca
83006			4-2	*white drywall with brown paper*	n	***None Detected***	25% ce	75% qu,gy
83007	036a-5		5-1	***Drywall, Surfacing**/ white surfaced white compound*	n	***None Detected***		100% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
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Polarized Light Asbestiform Materials Characterization

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Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036a, Calallen Stadium Pressbox

CA Labs Project #:
CAL25096955AG

Turnaround Time:
3 days

Date: 9/22/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83007			*5-2*	*white drywall with brown paper*	*n*	***None Detected***	25% ce	75% qu,gy
83008	036a-6		*6-1*	***12" Floor Tile**/ tan mastic*	*y*	***None Detected***		100% gy,bi
83008			*6-2*	*off-white floor tile*	*y*	***None Detected***		100% qu,ca
83008			*6-3*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83009	036a-7		*7-1*	***12" Floor Tile**/ tan mastic*	*y*	***None Detected***		100% gy,bi
83009			*7-2*	*off-white floor tile*	*y*	***None Detected***		100% qu,ca
83009			*7-3*	*tan mastic*	*y*	***None Detected***		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Technical Manager
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Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
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Turnaround Time:
3 days

Date: 9/22/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83010	036a-8		*8-1*	***12" Floor Tile**/ tan mastic*	*y*	***None Detected***		100% gy,bi
83010			*8-2*	*off-white floor tile*	*y*	***None Detected***		100% qu,ca
83010			*8-3*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83011	036a-9		*9-1*	***12" Floor Tile**/ gray floor tile*	*y*	***None Detected***		100% qu,ca
83011			*9-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83012	036a-10		*10-1*	***12" Floor Tile**/ gray floor tile*	*y*	***None Detected***		100% qu,ca
83012			*10-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

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gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
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Approved Signatories:

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Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

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Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83013	036a-11		*11-1*	***12" Floor Tile**/ gray floor tile*	*y*	***None Detected***		100% qu,ca
83013			*11-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83014	036a-12		*12-1*	***Cove Mastic**/ gray baseboard*	*y*	***None Detected***		100% gy,ma
83014			*12-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83015	036a-13		*13-1*	***Cove Mastic**/ gray baseboard*	*y*	***None Detected***		100% gy,ma
83015			*13-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83016	036a-14		*14-1*	***Cove Mastic**/ gray baseboard*	*y*	***None Detected***		100% gy,ma

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
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Approved Signatories:

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6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036a, Calallen Stadium Pressbox

CA Labs Project #:
CAL25096955AG

Turnaround Time:
3 days

Date: 9/22/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83016			*14-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83017	036a-15		*15-1*	***Roof Mastic**/ off-white sealant*	*y*	***None Detected***		100% qu,bi
83017			*15-2*	*black tar*	*y*	***None Detected***		100% qu,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs

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1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	**CA Labs Job #**	**CAL** 2509695
Client Address:	103 Canal St Mathis, TX 78368	Billing Address: (if different)	
Phone Number:	361-779-5064	P.O. # :	
Fax Number:		Project Name:	Calallen Stadium Press box
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036a

Total # Samples Submitted:	**Total # Samples to be Analyzed:**	**Material Matrix:** Air / Bulk / Water

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036a-6	12" Floor Tile	9-16-25	
036a-7	"	"	
036a-8	"	"	
036a-9	12" Floor Tile	"	
036a-10	"	"	
036a-11	"	"	
036a-12	Cove Mastic	"	
036a-13	"	"	
036a-14	"	"	
036a-15	Roof Mastic		

Custody Information:

Samples relinquished: Steve Strong 9-16-25 10:30AM
Signature / Date / Time

Samples received: SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	CA Labs Job #	CAL 25096955
Client Address:	103 Canal St.	Billing Address: (if different)	
	Mathis, Texas 78368		
Phone Number:	361-779-5064	P.O. #:	
Fax Number:		Project Name:	Calallen Stadium Pressbox
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 A

Contact: Steve Strong Report Results: Via: Email ____ FAX ____ Verbal ____

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix: Air / (Bulk) / Water

Please indicate appropriate turn around time.

Asbestos: *please call ahead for availability of all rush and/or after hours samples*

TEM	TA Time	PLM	TA Time	Optical / IAQ	TA Time
Circle analysis and select TA time		Circle analysis and select TA time	2 hour	**PCM**: NIOSH 7400	Note TAT
AHERA	4 hour	(EPA 600)	4 hour	**Allergen Particle**:	24 hour
EPA Level II	8 hour		8 hour	tape/bulk/swab	2 days
Drinking Water	16 hour		16 hour	Cyclex-d cassettes	3 days
Wipe	24 hour	AHERA	24 hour	Air-o-cell cassettes	5 days
Micro-vac	2 days		2 days	Anderson cultures	Specify
NIOSH 7402	3 days	Point Count -	(3 days)	Bulk/swab cultures	Mold or
Chatfield Bulk	5 days	(NESHAPS)	5 days	Bacteria cultures	bacteria

Lead: *Circle analysis and select TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater
TA Time:	8 hour	1 day	2 days	3 days	5 days

Sample Information:

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036a-1	Dry wall/Surfacing	9-16-25	
036a-2	"	"	
036a-3	"	"	
036a-4	"	"	
036a-5	"	"	

Custody Information:

Samples relinquished: Steve Strong 9.16.25 — Signature / Date / Time

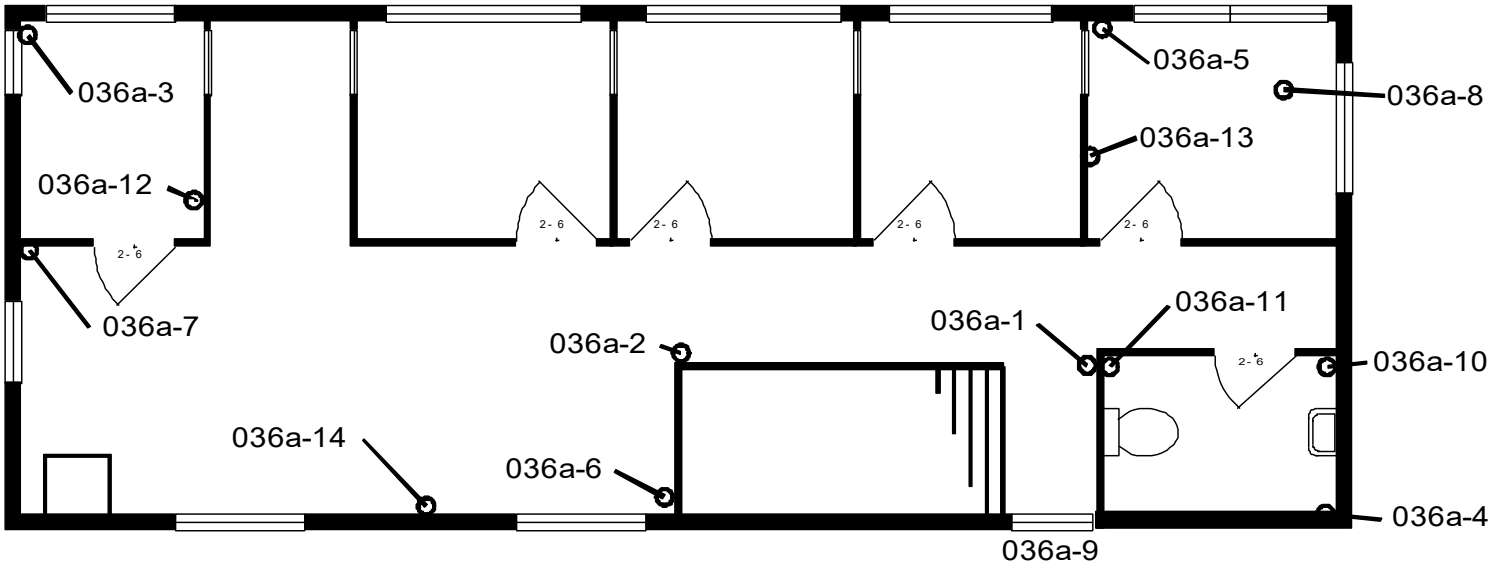
Samples received: 10:30AM SEP 17 2025 — Signature / Date / Time

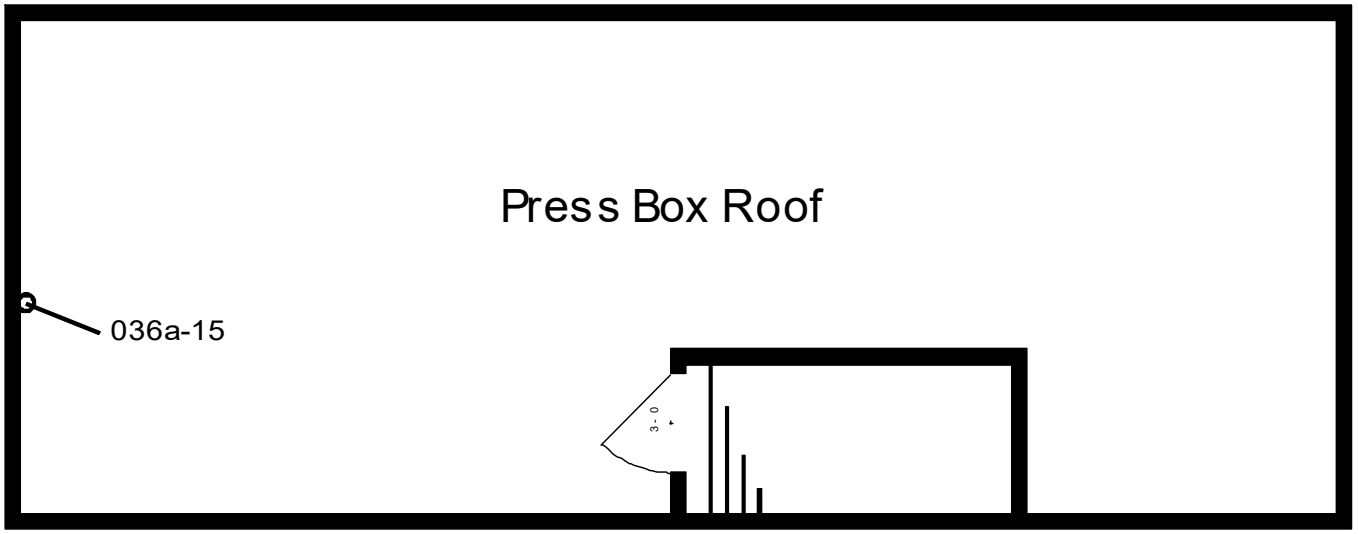
Samples relinquished: _____ — Signature / Date / Time

Samples received: _____ — Signature / Date / Time

TAB 3

SAMPLE
LOCATIONS MAP





25-036a Press Box

TEXAS CONSULTING SERVICES

*PO Box 610 * Mathis, Texas 78368*

*Phone: (361) 779-5064 * Fax: (432) 687-5456*

Email: stevestrong2a@yahoo.com

September 24, 2025

Project: Calallen Stadium Facilities
Calallen ISD
Corpus Christi, Texas
Attn: Blair McDavid
Email: bmcdavid@calallen.org
Phone: 361-242-5600

RE: Asbestos Inspection - Clothing Storage Building
4001 Wildcat Drive,
Corpus Christi, Texas

Mr. McDavid,

A thorough asbestos inspection was conducted at the Football Stadium Clothing Storage Building located at 4001 Wildcat Drive, Corpus Christi, Texas, on September 16 and 19, 2025. The sampling was conducted to allow demolition. Sampling of suspected materials discovered the following asbestos containing materials:

None of the materials observed and sampled were found to contain asbestos

The survey was completed by a Texas Department of State Health Services Licensed Management Planner, Mr. Steve Strong. If you have any questions regarding the information contained in this report, please contact our offices at your earliest convenience: (361) 779-5064.

Inspector Signature:

Sincerely,



Steve Strong

Certified Environmental Health Technician

TX Department of Licensing and Regulation Mold Assessment Consultant #MAC0334

TX Department of State Health Services Asbestos Management Planners' License #205048

TX Department of State Health Services Lead Inspector License #205048

TEXAS CONSULTING SERVICES
PO Box 610 * Mathis, Texas 78368
Phone: (361) 779-5064 * Fax: (432) 687-5456
Email: stevestrong2a@yahoo.com

ASBESTOS SURVEY REPORT FOR:

CLIENT:

Attn: Blair McDavid
Calallen ISD
Corpus Christi, Texas 78401

PROJECT SITE:

Football Stadium
Clothing Storage Building
4001 Wildcat Drive
Corpus Christi, Texas

INSPECTION DATE:
September 16 and 19, 2025
25-036b

INDEX

TAB 1 – ASBESTOS INSPECTION REPORT

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

TAB 1

ASBESTOS INSPECTION REPORT

TABLE OF CONTENTS

1.0 OVERVIEW

2.0 BUILDING DESCRIPTION

3.0 RESULTS OF SAMPLING FOR ACM

5.0 RECOMMENDATIONS

ADDITIONAL INFORMATION

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

ASBESTOS REPORT AND SUMMARY

SCOPE OF ASBESTOS INSPECTION

A. Texas Consulting Services will not be responsible for any asbestos containing materials (ACM) that were not found in the asbestos inspection of the site due to areas that were inaccessible or concealed. Since ACM inspection is limited to areas that are accessible to the inspector and not enclosed or otherwise concealed from the inspection process and additionally that non-destructive testing is performed during the inspection, the owner is advised that abatement or demolition may discover additional ACM on site. Unless stipulated in the project proposal, TCS does not perform exterior sampling for asbestos.

B. This inspection report is written based on the ACM inspection of the site and on the lab analysis of samples taken. The laboratories used are Department of State Health Services licensed and Texas Consulting Services assumes these analyses are true and correct but will not be responsible for their content.

C. Any damages done to the site will be the responsibility of the site owner. Some damage will occur as a part of the inspection process such as, but not limited to, floor tile, holes in walls, surfaces or pipes or other cosmetic damage. Texas Consulting Services will not be responsible for these damages.

D. Theft from the site will not be the responsibility of Texas Consulting Services.

E. This inspection is not a warranty as to the absence of ACM in the completed project.

F. Neither Texas Consulting Services, its employees or representatives have had, presently have, or contemplate having any interest in the subject property or are associated in any way with any party to this project.

1.0 Overview

A limited asbestos survey was performed by Texas Consulting Services on September 16 and 19, 2025, at the following project site: Football Stadium Clothing Storage Building at 4001 Wildcat Drive in Corpus Christi, Texas. Samples were taken of suspected interior materials (See 3.0 Table of Sampling Results).

The onsite structure was surveyed to determine the presence and Locations of ACM, if any, in the structure.

Asbestos in public buildings regulations were adopted under Art 4477-3A, Section 12 of the Texas Civil Statutes with enforcement authority given to the Texas Department of State Health Services.

The new regulations are very restrictive of who may perform asbestos-related activities. Building owners or their representatives should make sure that anyone doing asbestos work or consulting is licensed by the Texas Department of Health. All Texas Consulting Services personnel are licensed to perform a variety of asbestos related activities.

2.0 Building Description

The building has a slab foundation, built-up roof over concrete, drywall ceiling in the main wing, and CMU interior/exterior walls.

3.0 Results of Sampling for ACM (Asbestos)

The inspector took 11 bulk asbestos samples, from which the laboratory analyzed 19 layers.

The chart of the samples collected with laboratory results for asbestos being obtained from the samples is below:

Table of Sample Results, Location, Condition, Amount

Calallen Stadium Facilities
4001 Wildcat Drive
Corpus Christi, Texas

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative	1	036b-1-1	CMU Mortar White Surfaced Gray Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036b-2	CMU Mortar White Surfaced Gray Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036b-3	CMU Mortar White Surfaced Gray Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036b-4	CMU Mortar White Surfaced Gray Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036b-5	CMU Mortar White Surfaced Gray Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	2	Not Sampled	Metal Roof		N/A	G	Misc	NF	None

TSI – Thermal System Insulation
Surf – Surfacing
Misc – Miscellaneous
HA – Homogeneous Area

G – Good condition
D – Damaged
S – Significantly damaged

4.0 Sampling and Analysis Protocols

A discreet sample of each suspect ACM was obtained (if warranted) and placed into individual sample containers. Three samples of each homogenous material are required by DSHS regulations. Surfacing materials require 3, 5, or 7 samples according to the square footage present. The locations were noted on the survey form and assigned an individual laboratory identification number. This number was affixed to the sample container as the sample was collected. A survey form was also used to note material type (surfacing, thermal, or misc.), and general condition of the suspect ACM and a map was made to identify locations of samples. Attempts were made to obtain representative samples of like materials as this is the most cost-effective method for the determination of ACM. It should be noted that inspection and bulk sampling of roofing materials and window caulk was included in the scope of inspection. Although Texas Consulting Services used care to obtain bulk samples, it is necessary to take a representative quantity of suspect materials. This results in a certain amount of unavoidable damage to these materials.

During the asbestos survey, the inspector (sampler) wore appropriate respiratory protection when necessary (29CFR. 1910 and 1926, and EPA - 560 OPTS-86-0001, A Guide to Respiratory Protection for the Asbestos Abatement Industry).

Sample analyses were conducted using polarized light microscopy (PLM) with diffusion staining as required by EPA method 600/M4-82-020.

Air sampling, if warranted, was performed using Phase Contrast Microscopic (PCM) as required by NIOSH-582 and NIOSH-7400 Revision 3 (effective 5/15/89).

5.0 Recommendations

No asbestos was identified in any of the samples.

Work may proceed without asbestos concerns.

This survey was conducted by an asbestos management planner accredited & licensed in the State of Texas, Mr. Steve Strong, DSHS License #205048.

TAB 2

LABORATORY RESULTS

CA Labs
Dedicated to Quality

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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036a, Calallen Stadium Pressbox
Reference #: CAL25096955AG Date: 09/22/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
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Phone 225-751-5632
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Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036a, Calallen Stadium Pressbox **CA Labs Project #:** CAL25096955AG

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

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Polarized Light Asbestiform Materials Characterization

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Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036a, Calallen Stadium Pressbox

CA Labs Project #:
CAL25096955AG

Turnaround Time:
3 days

Date: 9/22/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83003	036a-1		*1-1*	***Drywall, Surfacing**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca
83004	036a-2		*2-1*	***Drywall, Surfacing**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca
83005	036a-3		*3-1*	***Drywall, Surfacing**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca
83005			*3-2*	*white drywall with brown paper*	*n*	***None Detected***	24% ce	76% qu,gy
83006	036a-4		*4-1*	***Drywall, Surfacing**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca
83006			*4-2*	*white drywall with brown paper*	*n*	***None Detected***	25% ce	75% qu,gy
83007	036a-5		*5-1*	***Drywall, Surfacing**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
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Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83010	036a-8		*8-1*	***12" Floor Tile**/ tan mastic*	*y*	***None Detected***		100% gy,bi
83010			*8-2*	*off-white floor tile*	*y*	***None Detected***		100% qu,ca
83010			*8-3*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83011	036a-9		*9-1*	***12" Floor Tile**/ gray floor tile*	*y*	***None Detected***		100% qu,ca
83011			*9-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83012	036a-10		*10-1*	***12" Floor Tile**/ gray floor tile*	*y*	***None Detected***		100% qu,ca
83012			*10-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM *TDSHS 30-0235*

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
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or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

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CA Labs Project #:
CAL25096955AG

Date: 9/22/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83013	036a-11		*11-1*	***12" Floor Tile**/ gray floor tile*	*y*	***None Detected***		100% qu,ca
83013			*11-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83014	036a-12		*12-1*	***Cove Mastic**/ gray baseboard*	*y*	***None Detected***		100% gy,ma
83014			*12-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83015	036a-13		*13-1*	***Cove Mastic**/ gray baseboard*	*y*	***None Detected***		100% gy,ma
83015			*13-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83016	036a-14		*14-1*	***Cove Mastic**/ gray baseboard*	*y*	***None Detected***		100% gy,ma

Dallas NVLAP Lab Code 200349-0 TEM/PLM *TDSHS 30-0235*

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
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Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036a, Calallen Stadium Pressbox

CA Labs Project #:
CAL25096955AG

Turnaround Time:
3 days

Date: 9/22/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83016			*14-2*	*tan mastic*	*y*	***None Detected***		100% gy,bi
83017	036a-15		*15-1*	***Roof Mastic**/ off-white sealant*	*y*	***None Detected***		100% qu,bi
83017			*15-2*	*black tar*	*y*	***None Detected***		100% qu,bi

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Robert Olivarez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
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8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs

CA Labs
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Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	CA Labs Job #	CAL 25096955
Client Address:	103 Canal St.	Billing Address: (if different)	
	Mathis, Texas 78368		
Phone Number:	361-779-5064	P.O. #:	
Fax Number:		Project Name:	Calallen Stadium Prussbox
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 a

Contact: Steve Strong

Report Results: Via: Email _____ FAX _____ Verbal

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix: Air / Bulk / Water

Please indicate appropriate turn around time.

Asbestos: *please call ahead for availability of all rush and/or after hours samples*

TEM	TA Time	PLM	TA Time	Optical / IAQ	TA Time
Circle analysis and select TA time		Circle analysis and select TA time	2 hour	**PCM**: NIOSH 7400	Note TAT
AHERA	4 hour	EPA 600	4 hour	**Allergen Particle**:	24 hour
EPA Level II	8 hour		8 hour	tape/bulk/swab	2 days
Drinking Water	16 hour		16 hour	Cyclex-d cassettes	3 days
Wipe	24 hour	AHERA	24 hour	Air-o-cell cassettes	5 days
Micro-vac	2 days		2 days	Anderson cultures	Specify
NIOSH 7402	3 days	Point Count -	3 days	Bulk/swab cultures	Mold or
Chatfield Bulk	5 days	(NESHAPS)	5 days	Bacteria cultures	bacteria

Lead: *Circle analysis and select TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater
TA Time:	8 hour	1 day	2 days	3 days	5 days

Sample Information:

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036a-1	Drywall/Surfacing	9-16-25	
036a-2			
036a-3			
036a-4			
036a-5			

Custody Information:

Samples relinquished: Steve Strong 9.16.25
Signature / Date / Time

Samples received: 10:30AM SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	**CA Labs Job #**	**CAL** 2509695
Client Address:	103 Canal St Mathis, TX 78368	Billing Address: (if different)	
Phone Number:	361-779-5064	P.O. # :	
Fax Number:		Project Name:	Calallen Stadium Press box
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036a

Total # Samples Submitted:	**Total # Samples to be Analyzed:**	**Material Matrix:** Air / Bulk / Water

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036a-6	12" Floor Tile	9-16-25	
036a-7	"	"	
036a-8	"	"	
036a-9	12" Floor Tile	"	
036a-10	"	"	
036a-11	"	"	
036a-12	Cove Mastic	"	
036a-13	"	"	
036a-14	"	"	
036a-15	Roof Mastic		

Custody Information:

Samples relinquished: [signature] 9-16-25 — Signature / Date / Time

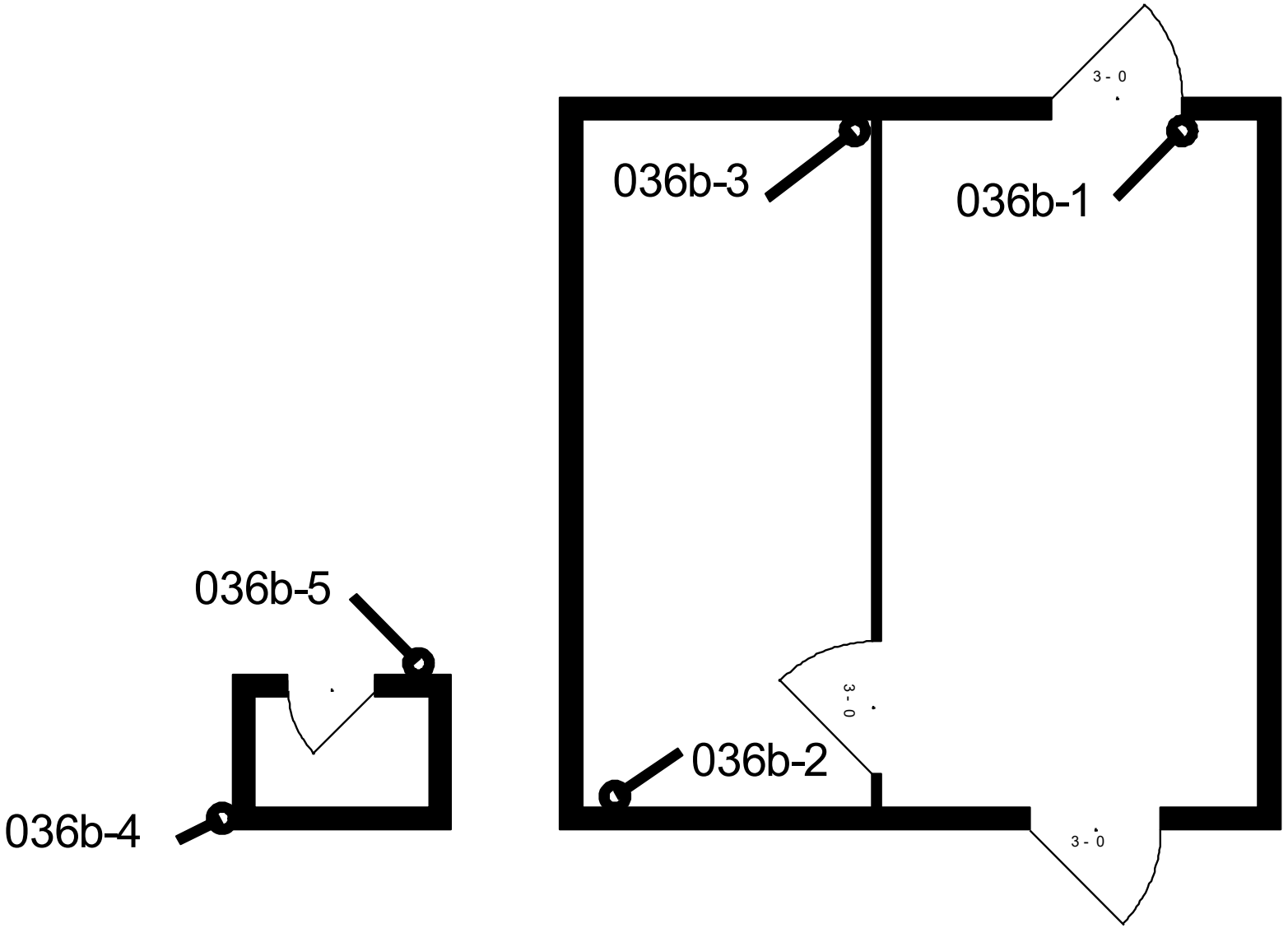
Samples received: SEP 17 2025 10:30AM — Signature / Date / Time

Samples relinquished: — Signature / Date / Time

Samples received: [signature] — Signature / Date / Time

TAB 3

SAMPLE
LOCATIONS MAP



25-036b Clothing Storage

TEXAS CONSULTING SERVICES

*PO Box 610 * Mathis, Texas 78368*

*Phone: (361) 779-5064 * Fax: (432) 687-5456*

Email: stevestrong2a@yahoo.com

September 24, 2025

Project: Calallen Stadium Facilities
Calallen ISD
Corpus Christi, Texas
Attn: Blair McDavid
Email: bmcdavid@calallen.org
Phone: 361-242-5600

RE: Asbestos Inspection - Grounds Maintenance Building
4001 Wildcat Drive,
Corpus Christi, Texas

Mr. McDavid,

A thorough asbestos inspection was conducted at the Football Stadium Grounds Maintenance Building located at 4001 Wildcat Drive, Corpus Christi, Texas, on September 16 and 19, 2025. The sampling was conducted to allow renovations. Sampling of suspected materials discovered the following asbestos containing materials:

None of the materials observed and sampled were found to contain asbestos

The survey was completed by a Texas Department of State Health Services Licensed Management Planner, Mr. Steve Strong. If you have any questions regarding the information contained in this report, please contact our offices at your earliest convenience: (361) 779-5064.

Inspector Signature:

Sincerely,



Steve Strong

Certified Environmental Health Technician

TX Department of Licensing and Regulation Mold Assessment Consultant #MAC0334

TX Department of State Health Services Asbestos Management Planners' License #205048

TX Department of State Health Services Lead Inspector License #205048

TEXAS CONSULTING SERVICES
PO Box 610 * Mathis, Texas 78368
Phone: (361) 779-5064 * Fax: (432) 687-5456
Email: stevestrong2a@yahoo.com

ASBESTOS SURVEY REPORT FOR:

CLIENT:

Attn: Blair McDavid
Calallen ISD
Corpus Christi, Texas 78401

PROJECT SITE:

Football Stadium
Grounds Maintenance Building
4001 Wildcat Drive
Corpus Christi, Texas

INSPECTION DATE:
September 16 and 19, 2025
25-036c

INDEX

TAB 1 – ASBESTOS INSPECTION REPORT

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

TAB 1

ASBESTOS INSPECTION REPORT

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1.0 OVERVIEW

2.0 BUILDING DESCRIPTION

3.0 RESULTS OF SAMPLING FOR ACM

5.0 RECOMMENDATIONS

ADDITIONAL INFORMATION

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

ASBESTOS REPORT AND SUMMARY

SCOPE OF ASBESTOS INSPECTION

A. Texas Consulting Services will not be responsible for any asbestos containing materials (ACM) that were not found in the asbestos inspection of the site due to areas that were inaccessible or concealed. Since ACM inspection is limited to areas that are accessible to the inspector and not enclosed or otherwise concealed from the inspection process and additionally that non-destructive testing is performed during the inspection, the owner is advised that abatement or demolition may discover additional ACM on site. Unless stipulated in the project proposal, TCS does not perform exterior sampling for asbestos.

B. This inspection report is written based on the ACM inspection of the site and on the lab analysis of samples taken. The laboratories used are Department of State Health Services licensed and Texas Consulting Services assumes these analyses are true and correct but will not be responsible for their content.

C. Any damages done to the site will be the responsibility of the site owner. Some damage will occur as a part of the inspection process such as, but not limited to, floor tile, holes in walls, surfaces or pipes or other cosmetic damage. Texas Consulting Services will not be responsible for these damages.

D. Theft from the site will not be the responsibility of Texas Consulting Services.

E. This inspection is not a warranty as to the absence of ACM in the completed project.

F. Neither Texas Consulting Services, its employees or representatives have had, presently have, or contemplate having any interest in the subject property or are associated in any way with any party to this project.

1.0 Overview

A limited asbestos survey was performed by Texas Consulting Services on September 16 and 19, 2025, at the following project site: Football Stadium Grounds Maintenance Building at 4001 Wildcat Drive in Corpus Christi, Texas. Samples were taken of suspected interior materials (See 3.0 Table of Sampling Results).

The onsite structure was surveyed to determine the presence and Locations of ACM, if any, in the structure.

Asbestos in public buildings regulations were adopted under Art 4477-3A, Section 12 of the Texas Civil Statutes with enforcement authority given to the Texas Department of State Health Services.

The new regulations are very restrictive of who may perform asbestos related activities. Building owners or their representatives should make sure that anyone doing asbestos work or consulting is licensed by the Texas Department of Health. All Texas Consulting Services personnel are licensed to perform a variety of asbestos related activities.

2.0 Building Description

The building has a slab foundation, built-up roof over concrete, drywall ceiling in the main wing, and CMU interior/exterior walls.

3.0 Results of Sampling for ACM (Asbestos)

The inspector took 11 bulk asbestos samples, from which the laboratory analyzed 19 layers.

The chart of the samples collected with laboratory results for asbestos being obtained from the samples is below:

Table of Sample Results, Location, Condition, Amount

Calallen Stadium Facilities
4001 Wildcat Drive
Corpus Christi, Texas

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative	1	036c-1	CMU Mortar, White Stucco	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036c-2	CMU Mortar, White Stucco	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036c-3	CMU Mortar, White Stucco	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	2	Not Sampled	Metal Roof	Walls, interior/exterior	N/A	G	Misc	NF	None

TSI – Thermal System Insulation
Surf – Surfacing
Misc – Miscellaneous
HA – Homogeneous Area

G – Good condition
D – Damaged
S – Significantly damaged

4.0 Sampling and Analysis Protocols

A discreet sample of each suspect ACM was obtained (if warranted) and placed into individual sample containers. Three samples of each homogenous material are required by DSHS regulations. Surfacing materials require 3, 5, or 7 samples according to the square footage present. The locations were noted on the survey form and assigned an individual laboratory identification number. This number was affixed to the sample container as the sample was collected. A survey form was also used to note material type (surfacing, thermal, or misc.), and general condition of the suspect ACM and a map was made to identify locations of samples. Attempts were made to obtain representative samples of like materials as this is the most cost-effective method for the determination of ACM. It should be noted that inspection and bulk sampling of roofing materials and window caulk was included in the scope of inspection. Although Texas Consulting Services used care to obtain bulk samples, it is necessary to take a representative quantity of suspect materials. This results in a certain amount of unavoidable damage to these materials.

During the asbestos survey, the inspector (sampler) wore appropriate respiratory protection when necessary (29CFR. 1910 and 1926, and EPA - 560 OPTS-86-0001, A Guide to Respiratory Protection for the Asbestos Abatement Industry).

Sample analyses were conducted using polarized light microscopy (PLM) with diffusion staining as required by EPA method 600/M4-82-020.

Air sampling, if warranted, was performed using Phase Contrast Microscopic (PCM) as required by NIOSH-582 and NIOSH-7400 Revision 3 (effective 5/15/89).

5.0 Recommendations

No asbestos was identified in any of the samples.

Work may proceed without asbestos concerns.

This survey was conducted by an asbestos management planner accredited & licensed in the State of Texas, Mr. Steve Strong, DSHS License #205048.

TAB 2

LABORATORY RESULTS

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036c, Calallen Stadium Grounds Mair
Reference #: CAL25096956AS Date: 09/19/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
Dedicated to Quality

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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036c, Calallen Stadium Grounds Maint. **CA Labs Project #:** CAL25096956AS

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

CA Labs

CA Labs
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Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	CA Labs Job #	CAL 25096956
Client Address:	103 Canal St.	Billing Address: (if different)	
	Mathis, Texas 78368		
Phone Number:	361-779-5064	P.O. #:	
Fax Number:		Project Name:	Calallen Stadium Grounds Maint
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 @ C

Contact: Steve Strong

Report Results: Via: Email ____ FAX ____ Verbal

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix: Air / Bulk / Water

Please indicate appropriate turn around time.

Asbestos: *please call ahead for availability of all rush and/or after hours samples*

TEM	TA Time	PLM	TA Time	Optical / IAQ	TA Time
Circle analysis and select TA time		Circle analysis and select TA time	2 hour	**PCM**: NIOSH 7400	Note TAT
AHERA	4 hour	~~EPA 600~~	4 hour	**Allergen Particle**:	24 hour
EPA Level II	8 hour		8 hour	tape/bulk/swab	2 days
Drinking Water	16 hour		16 hour	Cyclex-d cassettes	3 days
Wipe	24 hour	AHERA	24 hour	Air-o-cell cassettes	5 days
Micro-vac	2 days		2 days	Anderson cultures	Specify
NIOSH 7402	3 days	Point Count -	~~3 days~~	Bulk/swab cultures	Mold or
Chatfield Bulk	5 days	(NESHAPS)	5 days	Bacteria cultures	bacteria

Lead: *Circle analysis and select TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater
TA Time:	8 hour	1 day	2 days	3 days	5 days

Sample Information:

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036c-1	CMU Mortar	9.16-25	
036c-2	"	"	
036c-3	"	"	

Custody Information:

Samples relinquished: [signature] Signature / Date / Time

Samples received: 10:30AM SEP 17 2025 Signature / Date / Time

Samples relinquished: Signature / Date / Time

Samples received: [signature] Signature / Date / Time

CA Labs
Dedicated to Quality

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CA Labs, L.L.C.
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Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036c, Calallen Stadium Grounds Maint.

CA Labs Project #:
CAL25096956AS

Turnaround Time:
3 Days

Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83018	036c-1		*1-1*	***CMU Mortar**/ white stucco*	*y*	***None Detected***		100% qu,bi,ca
83019	036c-2		*2-1*	***CMU Mortar**/ tan surfaced tan stucco*	*n*	***None Detected***		100% qu,bi,ca
83020	036c-3		*3-1*	***CMU Mortar**/ tan surfaced gray cement/mortar*	*n*	***None Detected***		100% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Tomas Vazquez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
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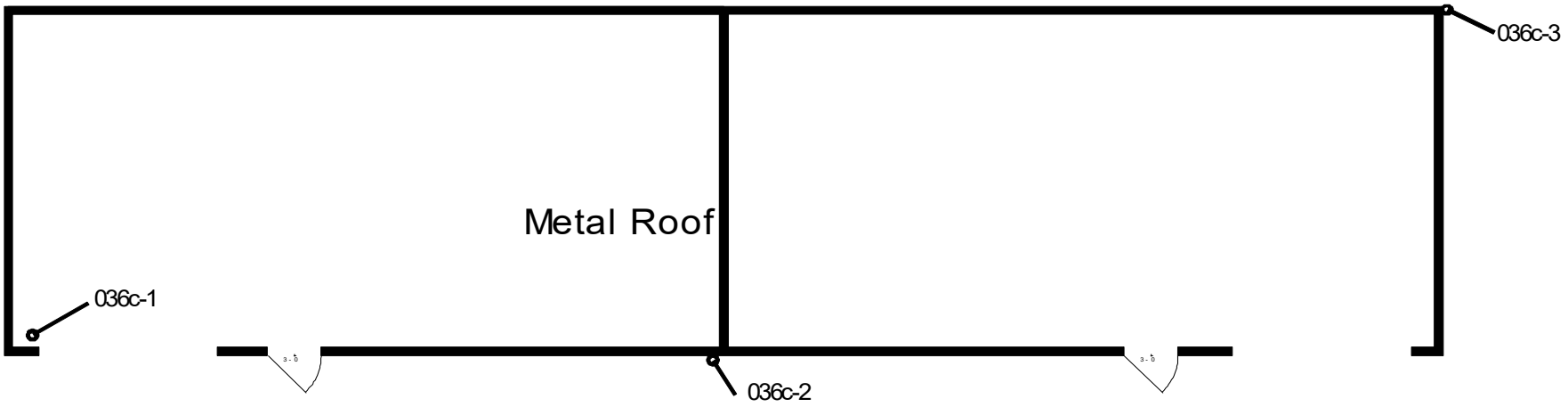
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

TAB 3

SAMPLE
LOCATIONS MAP



25-036c Grounds Maintenance Building

TEXAS CONSULTING SERVICES

*PO Box 610 * Mathis, Texas 78368*

*Phone: (361) 779-5064 * Fax: (432) 687-5456*

Email: stevestrong2a@yahoo.com

September 24, 2025

Project: Calallen Stadium Facilities
Calallen ISD
Corpus Christi, Texas
Attn: Blair McDavid
Email: bmcdavid@calallen.org
Phone: 361-242-5600

RE: Asbestos Inspection - **(**Project Name)
4001 Wildcat Drive,
Corpus Christi, Texas

Mr. McDavid,

A thorough asbestos inspection was conducted at the Football Stadium (Project Name) located at 4001 Wildcat Drive, Corpus Christi, Texas, on September 16 and 19, 2025. The sampling was conducted to allow renovations. Sampling of suspected materials discovered the following asbestos containing materials:

None of the materials observed and sampled were found to contain asbestos

The survey was completed by a Texas Department of State Health Services Licensed Management Planner, Mr. Steve Strong. If you have any questions regarding the information contained in this report, please contact our offices at your earliest convenience: (361) 779-5064.

Inspector Signature:

Sincerely,



Steve Strong

Certified Environmental Health Technician

TX Department of Licensing and Regulation Mold Assessment Consultant #MAC0334

TX Department of State Health Services Asbestos Management Planners' License #205048

TX Department of State Health Services Lead Inspector License #205048

TEXAS CONSULTING SERVICES
PO Box 610 * Mathis, Texas 78368
Phone: (361) 779-5064 * Fax: (432) 687-5456
Email: stevestrong2a@yahoo.com

ASBESTOS SURVEY REPORT FOR:

CLIENT:
Attn: Blair McDavid
Calallen ISD
Corpus Christi, Texas 78401

PROJECT SITE:
Football Stadium
(Project Name)
4001 Wildcat Drive
Corpus Christi, Texas

INSPECTION DATE:
September 16 and 19, 2025
TCS Project No.

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ASBESTOS INSPECTION REPORT

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ASBESTOS REPORT AND SUMMARY

SCOPE OF ASBESTOS INSPECTION

A. Texas Consulting Services will not be responsible for any asbestos containing materials (ACM) that were not found in the asbestos inspection of the site due to areas that were inaccessible or concealed. Since ACM inspection is limited to areas that are accessible to the inspector and not enclosed or otherwise concealed from the inspection process and additionally that non-destructive testing is performed during the inspection, the owner is advised that abatement or demolition may discover additional ACM on site. Unless stipulated in the project proposal, TCS does not perform exterior sampling for asbestos.

B. This inspection report is written based on the ACM inspection of the site and on the lab analysis of samples taken. The laboratories used are Department of State Health Services licensed and Texas Consulting Services assumes these analyses are true and correct but will not be responsible for their content.

C. Any damages done to the site will be the responsibility of the site owner. Some damage will occur as a part of the inspection process such as, but not limited to, floor tile, holes in walls, surfaces or pipes or other cosmetic damage. Texas Consulting Services will not be responsible for these damages.

D. Theft from the site will not be the responsibility of Texas Consulting Services.

E. This inspection is not a warranty as to the absence of ACM in the completed project.

F. Neither Texas Consulting Services, its employees or representatives have had, presently have, or contemplate having any interest in the subject property or are associated in any way with any party to this project.

1.0 Overview

A limited asbestos survey was performed by Texas Consulting Services on September 16 and 19, 2025, at the following project site: Football Stadium (Project Name) at 4001 Wildcat Drive in Corpus Christi, Texas. Samples were taken of suspected interior materials (See 3.0 Table of Sampling Results).

The onsite structure was surveyed to determine the presence and Locations of ACM, if any, in the structure.

Asbestos in public buildings regulations were adopted under Art 4477-3A, Section 12 of the Texas Civil Statutes with enforcement authority given to the Texas Department of State Health Services.

The new regulations are very restrictive of who may perform asbestos related activities. Building owners or their representatives should make sure that anyone doing asbestos work or consulting is licensed by the Texas Department of Health. All Texas Consulting Services personnel are licensed to perform a variety of asbestos related activities.

2.0 Building Description

The building has a slab foundation, built-up roof over concrete, drywall ceiling in the main wing, and CMU interior/exterior walls.

3.0 Results of Sampling for ACM (Asbestos)

The inspector took 6 bulk asbestos samples, from which the laboratory analyzed 7 layers.

The chart of the samples collected with laboratory results for asbestos being obtained from the samples is below:

Table of Sample Results, Location, Condition, Amount

Calallen Stadium Facilities
4001 Wildcat Drive
Corpus Christi, Texas

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative	1	036d-1	CMU Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036d-2	CMU Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036d-3	CMU Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative Negative	1-1 1-2	036d-4-1 036d-4-2	White Surfaced White Compound White Drywall With Brown Paper	Ceilings	N/A	G	Misc	F	None
Negative Negative	1-1 1-2	036d-5-1 036d-5-2	Tan Surfaced White Compound White Drywall With Brown Paper	Ceilings	N/A	G	Misc	F	None
Negative Negative	2-1 2-2	036d-6- 1036d-6-2	White Surfaced White Compound White Drywall With Brown Paper	Ceilings	N/A	G	Misc	F	None
Negative	2	036d-7	Built Up Roof	Flat Roof	N/A	G	Misc	NF	None
Negative	2	036d-8	Roof Mastic	Flat Roof	N/A	G	Misc	NF	None

TSI – Thermal System Insulation
Surf – Surfacing
Misc – Miscellaneous
HA – Homogeneous Area

G – Good condition
D – Damaged
S – Significantly damaged

4.0 Sampling and Analysis Protocols

A discreet sample of each suspect ACM was obtained (if warranted) and placed into individual sample containers. Three samples of each homogenous material are required by DSHS regulations. Surfacing materials require 3, 5, or 7 samples according to the square footage present. The locations were noted on the survey form and assigned an individual laboratory identification number. This number was affixed to the sample container as the sample was collected. A survey form was also used to note material type (surfacing, thermal, or misc.), and general condition of the suspect ACM and a map was made to identify locations of samples. Attempts were made to obtain representative samples of like materials as this is the most cost-effective method for the determination of ACM. It should be noted that inspection and bulk sampling of roofing materials and window caulk was included in the scope of inspection. Although Texas Consulting Services used care to obtain bulk samples, it is necessary to take a representative quantity of suspect materials. This results in a certain amount of unavoidable damage to these materials.

During the asbestos survey, the inspector (sampler) wore appropriate respiratory protection when necessary (29CFR. 1910 and 1926, and EPA - 560 OPTS-86-0001, A Guide to Respiratory Protection for the Asbestos Abatement Industry).

Sample analyses were conducted using polarized light microscopy (PLM) with diffusion staining as required by EPA method 600/M4-82-020.

Air sampling, if warranted, was performed using Phase Contrast Microscopic (PCM) as required by NIOSH-582 and NIOSH-7400 Revision 3 (effective 5/15/89).

5.0 Recommendations

No asbestos was identified in any of the samples.

Work may proceed without asbestos concerns.

This survey was conducted by an asbestos management planner accredited & licensed in the State of Texas, Mr. Steve Strong, DSHS License #205048.

TAB 2

LABORATORY RESULTS

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036d, Calallen Stadium Home RR
Reference #: CAL25096958AS Date: 09/19/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036d, Calallen Stadium Home RR **CA Labs Project #:** CAL25096958AS

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Phone # 361-779-5064
Fax #

Customer Project:
25-036d, Calallen Stadium Home RR

Turnaround Time:
3 Days

CA Labs Project #:
CAL25096958AS

Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83027	036d-1		1-1	***CMU Walls**/ white surfaced gray cement/mortar*	n	***None Detected***		100% qu,bi,ca
83028	036d-2		2-1	***CMU Walls**/ white surfaced gray cement/mortar*	n	***None Detected***		100% qu,bi,ca
83029	036d-3		3-1	***CMU Walls**/ white surfaced gray cement/mortar*	n	***None Detected***		100% qu,bi,ca
83030	036d-4		4-1	***Ceiling**/ white surfaced white compound*	n	***None Detected***		100% qu,bi,ca
83030			4-2	*white drywall with brown paper*	n	***None Detected***	22% ce	78% qu,gy
83031	036d-5		5-1	***Ceiling**/ white surfaced white compound*	n	***None Detected***		100% qu,bi,ca
83031			5-2	*white drywall with brown paper*	n	***None Detected***	22% ce	78% qu,gy

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Jose Matute
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036d, Calallen Stadium Home RR

CA Labs Project #:
CAL25096958AS

Turnaround Time:
3 Days

Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83032	036d-6		*6-1*	***Ceiling**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Jose Matute
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	**CA Labs Job #**	**CAL** 25096958
Client Address:	103 Canal St Mathis, TX 78368	Billing Address: (if different)	
Phone Number:	361-779-5064	P.O. # :	
Fax Number:		Project Name:	Calallen Stadium Home RR
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 d

Total # Samples Submitted:	**Total # Samples to be Analyzed:**	**Material Matrix:**
6	6	Air / (Bulk) / Water

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036 d-1	Restroom walls CMU	9-16-25	
036 d-2	"	"	
036-d 3	"	"	
036-d-4	Restroom Ceilings	"	
036-d-5	"	"	
036-d 6	"	"	

Custody Information:

Samples relinquished: Steve Strong 9-16-25
Signature / Date / Time

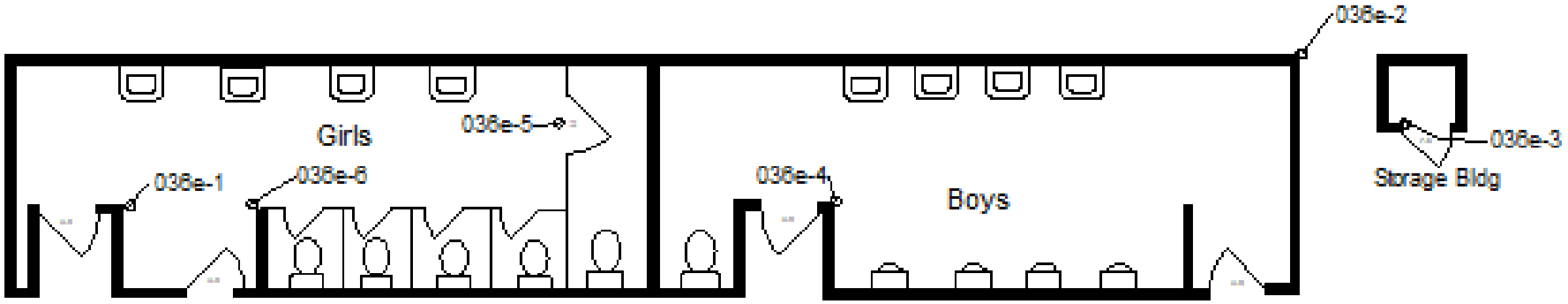
Samples received: 10:30AM SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

TAB 3

SAMPLE
LOCATIONS MAP



25-036e

Home North Restrooms

TEXAS CONSULTING SERVICES

*PO Box 610 * Mathis, Texas 78368*

*Phone: (361) 779-5064 * Fax: (432) 687-5456*

Email: stevestrong2a@yahoo.com

September 24, 2025

Project: Calallen Stadium Facilities
Calallen ISD
Corpus Christi, Texas
Attn: Blair McDavid
Email: bmcdavid@calallen.org
Phone: 361-242-5600

RE: Asbestos Inspection - Home Restrooms South
4001 Wildcat Drive,
Corpus Christi, Texas

Mr. McDavid,

A thorough asbestos inspection was conducted at the Football Stadium Home Restrooms South located at 4001 Wildcat Drive, Corpus Christi, Texas, on September 16 and 19, 2025. The sampling was conducted to allow renovations. Sampling of suspected materials discovered the following asbestos containing materials:

The roof mastic was found to contain ACM. Contractors performing roofing work should be informed of the presence and location of the ACM materials.

The survey was completed by a Texas Department of State Health Services Licensed Management Planner, Mr. Steve Strong. If you have any questions regarding the information contained in this report, please contact our offices at your earliest convenience: (361) 779-5064.

Inspector Signature:

Sincerely,

Steve Strong

Steve Strong

Certified Environmental Health Technician

TX Department of Licensing and Regulation Mold Assessment Consultant #MAC0334

TX Department of State Health Services Asbestos Management Planners' License #205048

TX Department of State Health Services Lead Inspector License #205048

TEXAS CONSULTING SERVICES
PO Box 610 * Mathis, Texas 78368
Phone: (361) 779-5064 * Fax: (432) 687-5456
Email: stevestrong2a@yahoo.com

ASBESTOS SURVEY
REPORT FOR:

CLIENT:

Attn: Blair McDavid
Calallen ISD
Corpus Christi, Texas 78401

PROJECT SITE:

Football Stadium
Home Restrooms South
4001 Wildcat Drive
Corpus Christi, Texas

INSPECTION DATE:
September 16 and 19, 2025
25-036e

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ASBESTOS INSPECTION REPORT

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ASBESTOS REPORT AND SUMMARY

SCOPE OF ASBESTOS INSPECTION

A. Texas Consulting Services will not be responsible for any asbestos containing materials (ACM) that were not found in the asbestos inspection of the site due to areas that were inaccessible or concealed. Since ACM inspection is limited to areas that are accessible to the inspector and not enclosed or otherwise concealed from the inspection process and additionally that non-destructive testing is performed during the inspection, the owner is advised that abatement or demolition may discover additional ACM on site. Unless stipulated in the project proposal, TCS does not perform exterior sampling for asbestos.

B. This inspection report is written based on the ACM inspection of the site and on the lab analysis of samples taken. The laboratories used are Department of State Health Services licensed and Texas Consulting Services assumes these analyses are true and correct but will not be responsible for their content.

C. Any damages done to the site will be the responsibility of the site owner. Some damage will occur as a part of the inspection process such as, but not limited to, floor tile, holes in walls, surfaces or pipes or other cosmetic damage. Texas Consulting Services will not be responsible for these damages.

D. Theft from the site will not be the responsibility of Texas Consulting Services.

E. This inspection is not a warranty as to the absence of ACM in the completed project.

F. Neither Texas Consulting Services, its employees or representatives have had, presently have, or contemplate having any interest in the subject property or are associated in any way with any party to this project.

1.0 Overview

A limited asbestos survey was performed by Texas Consulting Services on September 16 and 19, 2025, at the following project site: Football Stadium Home Restrooms South at 4001 Wildcat Drive in Corpus Christi, Texas. Samples were taken of suspected interior materials (See 3.0 Table of Sampling Results).

The onsite structure was surveyed to determine the presence and Locations of ACM, if any, in the structure.

Asbestos in public buildings regulations were adopted under Art 4477-3A, Section 12 of the Texas Civil Statutes with enforcement authority given to the Texas Department of State Health Services.

The new regulations are very restrictive of who may perform asbestos-related activities. Building owners or their representatives should make sure that anyone doing asbestos work or consulting is licensed by the Texas Department of Health. All Texas Consulting Services personnel are licensed to perform a variety of asbestos related activities.

2.0 Building Description

The building has a slab foundation, built-up roof over concrete, drywall ceilings, and CMU interior/exterior walls.

3.0 Results of Sampling for ACM (Asbestos)

The inspector took 8 bulk asbestos samples, from which the laboratory analyzed 11 layers.

The chart of the samples collected with laboratory results for asbestos being obtained from the samples is below:

Table of Sample Results, Location, Condition, Amount

Home South Restrooms
4001 Wildcat Drive
Corpus Christi, Texas

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative	1	036e-1	CMU Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036e-2	CMU Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036e-3	CMU Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative Negative	1-1 1-2	036e-4-1 036e-4-2	White Surfaced White Compound White Drywall With Brown Paper	Ceilings	N/A	G	Misc	F	None
Negative Negative	1-1 1-2	036e-5-1 036e-5-2	Tan Surfaced White Compound White Drywall With Brown Paper	Ceilings	N/A	G	Misc	F	None
Negative Negative	2-1 2-2	036e-6- 1036e-6-2	White Surfaced White Compound White Drywall With Brown Paper	Under Carpet Throughout Except Restrooms	N/A	G	Misc	F	None
Negative	2	036k-7	Built Up Roof	Flat Roof	N/A	G	Misc	NF	None
Positive	2	036k-8	Roof Mastic	Flat Roof	1,500 sq. ft.	G	Misc	NF	CA

TSI – Thermal System Insulation
Surf – Surfacing
Misc – Miscellaneous
HA – Homogeneous Area

G – Good condition
D – Damaged
S – Significantly damaged

CA – Contractors to be informed of the presence of the material before performing work on the roof

4.0 Sampling and Analysis Protocols

A discreet sample of each suspect ACM was obtained (if warranted) and placed into individual sample containers. Three samples of each homogenous material are required by DSHS regulations. Surfacing materials require 3, 5, or 7 samples according to the square footage present. The locations were noted on the survey form and assigned an individual laboratory identification number. This number was affixed to the sample container as the sample was collected. A survey form was also used to note material type (surfacing, thermal, or misc.), and general condition of the suspect ACM and a map was made to identify locations of samples. Attempts were made to obtain representative samples of like materials as this is the most cost-effective method for the determination of ACM. It should be noted that inspection and bulk sampling of roofing materials and window caulk was included in the scope of inspection. Although Texas Consulting Services used care to obtain bulk samples, it is necessary to take a representative quantity of suspect materials. This results in a certain amount of unavoidable damage to these materials.

During the asbestos survey, the inspector (sampler) wore appropriate respiratory protection when necessary (29CFR. 1910 and 1926, and EPA - 560 OPTS-86-0001, A Guide to Respiratory Protection for the Asbestos Abatement Industry).

Sample analyses were conducted using polarized light microscopy (PLM) with diffusion staining as required by EPA method 600/M4-82-020.

Air sampling, if warranted, was performed using Phase Contrast Microscopic (PCM) as required by NIOSH-582 and NIOSH-7400 Revision 3 (effective 5/15/89).

5.0 Recommendations

No asbestos was identified in any of the samples.

Work may proceed without asbestos concerns.

This survey was conducted by an asbestos management planner accredited & licensed in the State of Texas, Mr. Steve Strong, DSHS License #205048.

TAB 2

LABORATORY RESULTS

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036e, Calallen Stadium Home RRS
Reference #: CAL25096957AG Date: 09/22/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
Dedicated to Quality

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Phone 225-751-5632
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Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036e, Calallen Stadium Home RRS **CA Labs Project #:** CAL25096957AG

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

CA Labs
Dedicated to Quality

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Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036e, Calallen Stadium Home RRS

Turnaround Time:
3 days

CA Labs Project #:
CAL25096957AG

Date: 9/22/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83021	036e-1		*1-1*	***CMU Mortar**/ gray surfaced gray cement/mortar*	*n*	***None Detected***		100% qu,bi,ca
83022	036e-2		*2-1*	***CMU Mortar**/ gray surfaced gray cement/mortar*	*n*	***None Detected***		100% qu,bi,ca
83023	036e-3		*3-1*	***CMU Mortar**/ gray surfaced gray cement/mortar*	*n*	***None Detected***		100% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Jose Matute
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	**CA Labs Job #**	**CAL** 25096957
Client Address:	103 Canal St Mathis, TX 78368	Billing Address: (if different)	
Phone Number:	361-779-5064	P.O. # :	
Fax Number:		Project Name:	Calallen Stadium
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 e

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix:
6	6	Air / Bulk / Water

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036e-6	Drywall	9.16-25	

Custody Information:

10:30AM

Samples relinquished: Steve Strong 9/26/25
Signature / Date / Time

Samples received: SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	CA Labs Job #	CAL 25096957
Client Address:	103 Canal St.	Billing Address: (if different)	
	Mathis, Texas 78368		
Phone Number:	361-779-5064	P.O. #:	
Fax Number:		Project Name:	Calallen Stadium Homerun
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 e

Contact: Steve Strong Report Results: Via: Email ____ FAX ____ Verbal ____

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix: Air / Bulk / Water
6	6	

Please indicate appropriate turn around time.

Asbestos: *please call ahead for availability of all rush and/or after hours samples*

TEM	TA Time	PLM	TA Time	Optical / IAQ	TA Time
Circle analysis and select TA time		Circle analysis and select TA time	2 hour	**PCM**: NIOSH 7400	Note TAT
AHERA	4 hour	EPA 600	4 hour	**Allergen Particle**:	24 hour
EPA Level II	8 hour		8 hour	tape/bulk/swab	2 days
Drinking Water	16 hour		16 hour	Cyclex-d cassettes	3 days
Wipe	24 hour	AHERA	24 hour	Air-o-cell cassettes	5 days
Micro-vac	2 days		2 days	Anderson cultures	Specify
NIOSH 7402	3 days	Point Count -	3 days	Bulk/swab cultures	Mold or
Chatfield Bulk	5 days	(NESHAPS)	5 days	Bacteria cultures	bacteria

Lead: *Circle analysis and select TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater
TA Time:	8 hour	1 day	2 days	3 days	5 days

Sample Information:

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036e-1	CMU Mortar	9.16.25	
036e-2	"	"	
036e-3	"	"	
036e-4	Drywall	"	
036e-5	"	"	

Custody Information:

Samples relinquished: [signature] 9.16.25
Signature / Date / Time

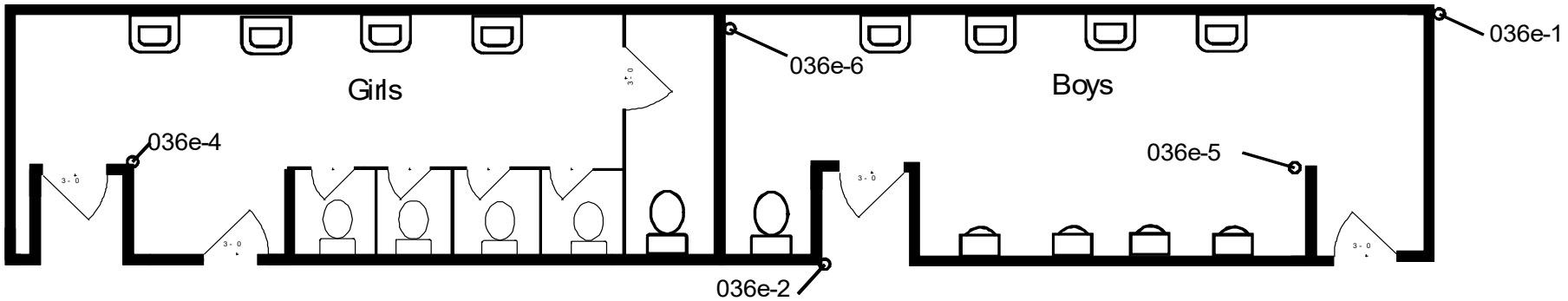
Samples received: 10:30AM SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

TAB 3

SAMPLE
LOCATIONS MAP



25-036e
Home South Restrooms

TEXAS CONSULTING SERVICES

*PO Box 610 * Mathis, Texas 78368*

*Phone: (361) 779-5064 * Fax: (432) 687-5456*

Email: stevestrong2a@yahoo.com

September 24, 2025

Project: Calallen Stadium Facilities
Calallen ISD
Corpus Christi, Texas
Attn: Blair McDavid
Email: bmcdavid@calallen.org
Phone: 361-242-5600

RE: Asbestos Inspection - North Visitor Restroom
4001 Wildcat Drive,
Corpus Christi, Texas

Mr. McDavid,

A thorough asbestos inspection was conducted at the Football Stadium North Visitor Restroom located at 4001 Wildcat Drive, Corpus Christi, Texas, on September 16 and 19, 2025. The sampling was conducted to allow renovations. Sampling of suspected materials discovered the following asbestos containing materials:

None of the materials observed and sampled were found to contain asbestos

The survey was completed by a Texas Department of State Health Services Licensed Management Planner, Mr. Steve Strong. If you have any questions regarding the information contained in this report, please contact our offices at your earliest convenience: (361) 779-5064.

Inspector Signature:

Sincerely,



Steve Strong

Certified Environmental Health Technician

TX Department of Licensing and Regulation Mold Assessment Consultant #MAC0334

TX Department of State Health Services Asbestos Management Planners' License #205048

TX Department of State Health Services Lead Inspector License #205048

TEXAS CONSULTING SERVICES
PO Box 610 * Mathis, Texas 78368
Phone: (361) 779-5064 * Fax: (432) 687-5456
Email: stevestrong2a@yahoo.com

ASBESTOS SURVEY REPORT FOR:

CLIENT:

Attn: Blair McDavid
Calallen ISD
Corpus Christi, Texas 78401

PROJECT SITE:

Football Stadium
North Visitor Restroom
4001 Wildcat Drive
Corpus Christi, Texas

INSPECTION DATE:
September 16 and 19, 2025
25-036f

INDEX

TAB 1 – ASBESTOS INSPECTION REPORT

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

TAB 1

ASBESTOS INSPECTION REPORT

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1.0 OVERVIEW

2.0 BUILDING DESCRIPTION

3.0 RESULTS OF SAMPLING FOR ACM

5.0 RECOMMENDATIONS

ADDITIONAL INFORMATION

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

ASBESTOS REPORT AND SUMMARY

SCOPE OF ASBESTOS INSPECTION

A. Texas Consulting Services will not be responsible for any asbestos containing materials (ACM) that were not found in the asbestos inspection of the site due to areas that were inaccessible or concealed. Since ACM inspection is limited to areas that are accessible to the inspector and not enclosed or otherwise concealed from the inspection process and additionally that non-destructive testing is performed during the inspection, the owner is advised that abatement or demolition may discover additional ACM on site. Unless stipulated in the project proposal, TCS does not perform exterior sampling for asbestos.

B. This inspection report is written based on the ACM inspection of the site and on the lab analysis of samples taken. The laboratories used are Department of State Health Services licensed and Texas Consulting Services assumes these analyses are true and correct but will not be responsible for their content.

C. Any damages done to the site will be the responsibility of the site owner. Some damage will occur as a part of the inspection process such as, but not limited to, floor tile, holes in walls, surfaces or pipes or other cosmetic damage. Texas Consulting Services will not be responsible for these damages.

D. Theft from the site will not be the responsibility of Texas Consulting Services.

E. This inspection is not a warranty as to the absence of ACM in the completed project.

F. Neither Texas Consulting Services, its employees or representatives have had, presently have, or contemplate having any interest in the subject property or are associated in any way with any party to this project.

1.0 Overview

A limited asbestos survey was performed by Texas Consulting Services on September 16 and 19, 2025, at the following project site: Football Stadium North Visitor Restroom at 4001 Wildcat Drive in Corpus Christi, Texas. Samples were taken of suspected interior materials (See 3.0 Table of Sampling Results).

The onsite structure was surveyed to determine the presence and Locations of ACM, if any, in the structure.

Asbestos in public buildings regulations were adopted under Art 4477-3A, Section 12 of the Texas Civil Statutes with enforcement authority given to the Texas Department of State Health Services.

The new regulations are very restrictive of who may perform asbestos related activities. Building owners or their representatives should make sure that anyone doing asbestos work or consulting is licensed by the Texas Department of Health. All Texas Consulting Services personnel are licensed to perform a variety of asbestos related activities.

2.0 Building Description

The building has a slab foundation, built-up roof over concrete, drywall ceiling in the main wing, and CMU interior/exterior walls.

3.0 Results of Sampling for ACM (Asbestos)

The inspector took 6 bulk asbestos samples, from which the laboratory analyzed 11 layers.

The chart of the samples collected with laboratory results for asbestos being obtained from the samples is below:

Table of Sample Results, Location, Condition, Amount

Calallen Stadium Facilities
4001 Wildcat Drive
Corpus Christi, Texas

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative Negative	1-1 1-2	036f-1-1 036f-1-2	CMU Mortar White Finished Brown Finishing Mortar Gray Plaster	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036f-2	CMU Mortar White Finished Brown Finishing Mortar Gray Plaster	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036f-3	Tan Surfaced White Compound White Joint Compound Under Tape White Drywall With Brown Paper	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative Negative Negative	1-1 1-2 1-3	036f-4-1 036f-4-2 036f-4-3	Tan Surfaced White Compound White Joint Compound Under Tape White Drywall With Brown Paper	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative Negative Negative	1-1 1-2 1-3	036f-5-1 036f-5-2 036f-5-3	Tan Surfaced White Compound White Joint Compound Under Tape White Drywall With Brown Paper	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative Negative Negative	2-1 2-2 2-3	036f-6-1 036f-6-2 036f-6-3	Tan Mastic 12” Floor Tile White with Blue Flecks Tan Floor Tile mastic	Under Carpet Throughout Except Restrooms	N/A	G	Misc	F	None
Negative	2	036f-7-1 036f-7-2	Tan Mastic 12” Floor Tile White with Blue Flecks Tan Floor Tile mastic	Under Carpet Throughout Except Restrooms	N/A	G	Misc	F	None
Negative	2	036f-8	Tan Mastic 12” Floor Tile White with Blue Flecks Tan Floor Tile mastic	Under Carpet Throughout Except Restrooms	N/A	G	Misc	F	None
Negative	2	036f-9	12” Floor Tile White with Blue Flecks Tan Floor Tile mastic	Restroom	N/A	G	Misc	NF	None
Negative Negative	3-1 3-2	036f-10-1 036f-10-2	12” Floor Tile White with Blue Flecks Tan Floor Tile mastic	Restroom	N/A	G	Misc	NF	None
Negative	3	036f-11	12” Floor Tile White with Blue Flecks Tan Floor Tile mastic	Restroom	N/A	G	Misc	NF	None
Negative	4	036f-12	Cove Base Mastic	All Rooms, Hall	N/A	G	Misc	NF	None
Negative	4	036f-13-1 036f-13-2	Cove Base Mastic	All Rooms, Hall	N/A	G	Misc	NF	None
Negative	4	036f-14	Cove Base Mastic	All Rooms, Hall	N/A	G	Misc	NF	None
Negative	5	036f-15	Roof Mastic	Roof of Press Box	N/A	G	Misc	NF	None

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative	1-1	036a-1-1	CMU Mortar White Surfaced Brown Finishing Plaster	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1-2	036a-1-2	Gray Plaster						
Negative	1-1	036a-2-1	CMU Mortar White Surfaced Brown Finishing Plaster	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1-2	036a-2-2	Gray Plaster						
Negative	1-1	036a-3-1	CMU Mortar White Surfaced Brown Finishing Plaster	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1-2	036a-3-2	Gray Plaster						
Negative	1-1	036a-4-1	White Surfaced White Compound	Ceilings	N/A	G	Misc	F	None
Negative	1-2	036a-4-2	White Drywall With Brown Paper						
Negative	1-1	036a-5-1 036a-5-2	White Surfaced White Compound	Ceilings	N/A	G	Misc	F	None
Negative	1-2	036a-5-3	White Drywall With Brown Paper						
Negative	1-1	036a-5-1	White Surfaced White Compound	Ceilings	N/A	G	Misc	F	None
Negative	1-2	036a-5-2	White Drywall With Brown Paper						
Negative	5	036a-15	Roof Mastic	Roof of Press Box	N/A	G	Misc	NF	None

TSI – Thermal System Insulation
Surf – Surfacing
Misc – Miscellaneous
HA – Homogeneous Area

G – Good condition
D – Damaged
S – Significantly damaged

4.0 Sampling and Analysis Protocols

A discreet sample of each suspect ACM was obtained (if warranted) and placed into individual sample containers. Three samples of each homogenous material are required by DSHS regulations. Surfacing materials require 3, 5, or 7 samples according to the square footage present. The locations were noted on the survey form and assigned an individual laboratory identification number. This number was affixed to the sample container as the sample was collected. A survey form was also used to note material type (surfacing, thermal, or misc.), and general condition of the suspect ACM and a map was made to identify locations of samples. Attempts were made to obtain representative samples of like materials as this is the most cost-effective method for the determination of ACM. It should be noted that inspection and bulk sampling of roofing materials and window caulk was included in the scope of inspection. Although Texas Consulting Services used care to obtain bulk samples, it is necessary to take a representative quantity of suspect materials. This results in a certain amount of unavoidable damage to these materials.

During the asbestos survey, the inspector (sampler) wore appropriate respiratory protection when necessary (29CFR. 1910 and 1926, and EPA - 560 OPTS-86-0001, A Guide to Respiratory Protection for the Asbestos Abatement Industry).

Sample analyses were conducted using polarized light microscopy (PLM) with diffusion staining as required by EPA method 600/M4-82-020.

Air sampling, if warranted, was performed using Phase Contrast Microscopic (PCM) as required by NIOSH-582 and NIOSH-7400 Revision 3 (effective 5/15/89).

5.0 Recommendations

No asbestos was identified in any of the samples.

Work may proceed without asbestos concerns.

This survey was conducted by an asbestos management planner accredited & licensed in the State of Texas, Mr. Steve Strong, DSHS License #205048.

TAB 2

LABORATORY RESULTS

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
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Phone 972-242-2754
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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036f, Calallen Stadium Visitor North F
Reference #: CAL25096961AS Date: 09/19/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
Dedicated to Quality

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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036f, Calallen Stadium Visitor North RR **CA Labs Project #:** CAL25096961AS

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate	pe - perlite	fg - fiberglass	pa - palygorskite (clay)
gypsum - gypsum	qu - quartz	mw - mineral wool	
bi - binder		wo - wollastinite	
or - organic		ta - talc	
ma - matrix		sy - synthetic	
mi - mica		ce - cellulose	
ve - vermiculite		br - brucite	
ot - other		ka - kaolin (clay)	

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Phone # 361-779-5064
Fax #

Attn: Steve Strong

Customer Project:
25-036f, Calallen Stadium Visitor North RR

Turnaround Time:
3 Days

CA Labs Project #:
CAL25096961AS

Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83049	036f-1		1-1	***CMU Mortar**/ white surfaced brown finishing plaster*	n	***None Detected***		100% qu,bi,ca
83049			1-2	*gray plaster*	y	***None Detected***		100% qu,ca
83050	036f-2		2-1	***CMU Mortar**/ white surfaced brown finishing plaster*	n	***None Detected***		100% qu,bi,ca
83050			2-2	*gray plaster*	y	***None Detected***		100% qu,ca
83051	036f-3		3-1	***CMU Mortar**/ white surfaced brown finishing plaster*	n	***None Detected***		100% qu,bi,ca
83051			3-2	*gray plaster*	y	***None Detected***		100% qu,ca
83052	036f-4		4-1	***Drywall**/ white compound*	y	***None Detected***		100% qu,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Baton Rouge, LA 70809
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Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Phone # 361-779-5064
Fax #

Attn: Steve Strong

Customer Project:
25-036f, Calallen Stadium Visitor North RR

Turnaround Time:
3 Days

CA Labs Project #:
CAL25096961AS

Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83052			*4-2*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
83053	036f-5		*5-1*	***Drywall**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca
83053			*5-2*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
83054	036f-6		*6-1*	***Drywall**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
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7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs

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Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	CA Labs Job #	CAL 25096961
Client Address:	103 Canal St. Mathis, Texas 78368	Billing Address: (if different)	
Phone Number:	361-779-5064	P.O. #:	
Fax Number:		Project Name:	Calallen Stadium Visitor N RR
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 F

Contact: Steve Strong

Report Results: Via: Email FAX Verbal

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix: Air / Bulk / Water
6	6	Air

Please indicate appropriate turn around time.

Asbestos: *please call ahead for availability of all rush and/or after hours samples*

TEM	TA Time	PLM	TA Time	Optical / IAQ	TA Time
Circle analysis and select TA time		Circle analysis and select TA time	2 hour	**PCM**: NIOSH 7400	Note TAT
AHERA	4 hour	EPA 600	4 hour	**Allergen Particle**:	24 hour
EPA Level II	8 hour		8 hour	tape/bulk/swab	2 days
Drinking Water	16 hour		16 hour	Cyclex-d cassettes	3 days
Wipe	24 hour	AHERA	24 hour	Air-o-cell cassettes	5 days
Micro-vac	2 days		2 days	Anderson cultures	Specify
NIOSH 7402	3 days	Point Count -	3 days	Bulk/swab cultures	Mold or
Chatfield Bulk	5 days	(NESHAPS)	5 days	Bacteria cultures	bacteria

Lead: *Circle analysis and select TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater
TA Time:	8 hour	1 day	2 days	3 days	5 days

Sample Information:

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036F-1	CMU Mortar	9.16.25	
036F2	"		
036F3	"		
036F4	Drywall		
036F5	"		

Custody Information:

Samples relinquished: Steve Strong
Signature / Date / Time

Samples received: 10:30AM SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

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Carrollton, TX 75006

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Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	**CA Labs Job #**	**CAL** 25096961
Client Address:	103 Canal St Mathis, TX 78368	Billing Address: (if different)	
Phone Number:	361-779-5064	P.O. # :	
Fax Number:		Project Name:	Calallen Stadium North RA
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 f

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix:
6	6	Air / Bulk / Water

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036-6	Drywall	9.16.25	

Custody Information:

10:30AM

Samples relinquished: Steve Strong 9-16-25
Signature / Date / Time

Samples received: SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

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Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036f, Calallen Stadium Visitor North F
Reference #: CAL25096961AS Date: 09/19/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

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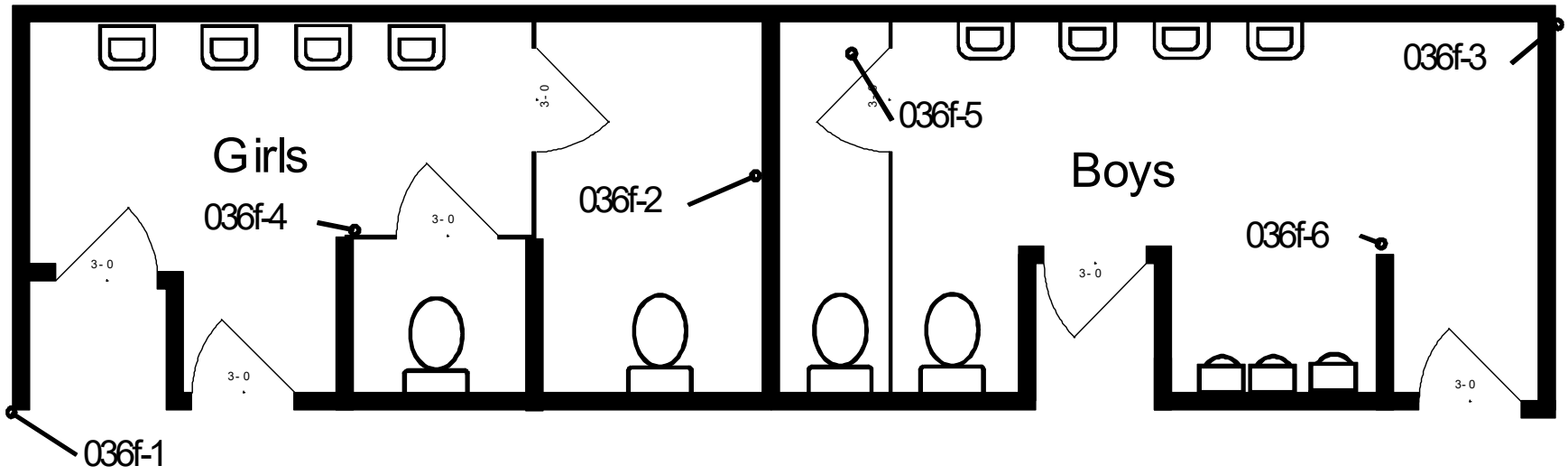
Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

TAB 3

SAMPLE
LOCATIONS MAP



Visitor's Restroooms North
25-036f

TEXAS CONSULTING SERVICES

*PO Box 610 * Mathis, Texas 78368*

*Phone: (361) 779-5064 * Fax: (432) 687-5456*

Email: stevestrong2a@yahoo.com

September 24, 2025

Project: Calallen Stadium Facilities
Calallen ISD
Corpus Christi, Texas
Attn: Blair McDavid
Email: bmcdavid@calallen.org
Phone: 361-242-5600

RE: Asbestos Inspection - Home Restrooms South
4001 Wildcat Drive,
Corpus Christi, Texas

Mr. McDavid,

A thorough asbestos inspection was conducted at the Football Stadium Home Restrooms South located at 4001 Wildcat Drive, Corpus Christi, Texas, on September 16 and 19, 2025. The sampling was conducted to allow renovations. Sampling of suspected materials discovered the following asbestos containing materials:

The Laboratory reported that the roof mastic contains asbestos

The survey was completed by a Texas Department of State Health Services Licensed Management Planner, Mr. Steve Strong. If you have any questions regarding the information contained in this report, please contact our offices at your earliest convenience: (361) 779-5064.

Inspector Signature:

Sincerely,



Steve Strong

Certified Environmental Health Technician

TX Department of Licensing and Regulation Mold Assessment Consultant #MAC0334

TX Department of State Health Services Asbestos Management Planners' License #205048

TX Department of State Health Services Lead Inspector License #205048

TEXAS CONSULTING SERVICES
PO Box 610 * Mathis, Texas 78368
Phone: (361) 779-5064 * Fax: (432) 687-5456
Email: stevestrong2a@yahoo.com

ASBESTOS SURVEY REPORT FOR:

CLIENT:

Attn: Blair McDavid
Calallen ISD
Corpus Christi, Texas 78401

PROJECT SITE:

Football Stadium
Home Restrooms South
4001 Wildcat Drive
Corpus Christi, Texas

INSPECTION DATE:
September 16 and 19, 2025
25-036f

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TAB 1 – ASBESTOS INSPECTION REPORT

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

TAB 1

ASBESTOS INSPECTION REPORT

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1.0 OVERVIEW

2.0 BUILDING DESCRIPTION

3.0 RESULTS OF SAMPLING FOR ACM

5.0 RECOMMENDATIONS

ADDITIONAL INFORMATION

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

ASBESTOS REPORT AND SUMMARY

SCOPE OF ASBESTOS INSPECTION

A. Texas Consulting Services will not be responsible for any asbestos containing materials (ACM) that were not found in the asbestos inspection of the site due to areas that were inaccessible or concealed. Since ACM inspection is limited to areas that are accessible to the inspector and not enclosed or otherwise concealed from the inspection process and additionally that non-destructive testing is performed during the inspection, the owner is advised that abatement or demolition may discover additional ACM on site. Unless stipulated in the project proposal, TCS does not perform exterior sampling for asbestos.

B. This inspection report is written based on the ACM inspection of the site and on the lab analysis of samples taken. The laboratories used are Department of State Health Services licensed and Texas Consulting Services assumes these analyses are true and correct but will not be responsible for their content.

C. Any damages done to the site will be the responsibility of the site owner. Some damage will occur as a part of the inspection process such as, but not limited to, floor tile, holes in walls, surfaces or pipes or other cosmetic damage. Texas Consulting Services will not be responsible for these damages.

D. Theft from the site will not be the responsibility of Texas Consulting Services.

E. This inspection is not a warranty as to the absence of ACM in the completed project.

F. Neither Texas Consulting Services, its employees or representatives have had, presently have, or contemplate having any interest in the subject property or are associated in any way with any party to this project.

1.0 Overview

A limited asbestos survey was performed by Texas Consulting Services on September 16 and 19, 2025, at the following project site: Football Stadium Home Restrooms South at 4001 Wildcat Drive in Corpus Christi, Texas. Samples were taken of suspected interior materials (See 3.0 Table of Sampling Results).

The onsite structure was surveyed to determine the presence and Locations of ACM, if any, in the structure.

Asbestos in public buildings regulations were adopted under Art 4477-3A, Section 12 of the Texas Civil Statutes with enforcement authority given to the Texas Department of State Health Services.

The new regulations are very restrictive of who may perform asbestos-related activities. Building owners or their representatives should make sure that anyone doing asbestos work or consulting is licensed by the Texas Department of Health. All Texas Consulting Services personnel are licensed to perform a variety of asbestos related activities.

2.0 Building Description

The building has a slab foundation, built-up roof over concrete, drywall ceilings, and CMU interior/exterior walls.

3.0 Results of Sampling for ACM (Asbestos)

The inspector took 5 bulk asbestos samples, from which the laboratory analyzed 5 layers.

The chart of the samples collected with laboratory results for asbestos being obtained from the samples is below:

Table of Sample Results, Location, Condition, Amount

Home South Restrooms
4001 Wildcat Drive
Corpus Christi, Texas

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative	1	036e-1	CMU Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036e-2	CMU Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036e-3	CMU Mortar	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	2	036k-7	Built Up Roof	Flat Roof	N/A	G	Misc	NF	None
Positive	2	036k-8	Roof Mastic	Flat Roof	1,500 sq. ft.	G	Misc	NF	CA

TSI – Thermal System Insulation
Surf – Surfacing
Misc – Miscellaneous
HA – Homogeneous Area

G – Good condition
D – Damaged
S – Significantly damaged

CA – Contractors to be informed of the presence of the material before performing work on the roof

4.0 Sampling and Analysis Protocols

A discreet sample of each suspect ACM was obtained (if warranted) and placed into individual sample containers. Three samples of each homogenous material are required by DSHS regulations. Surfacing materials require 3, 5, or 7 samples according to the square footage present. The locations were noted on the survey form and assigned an individual laboratory identification number. This number was affixed to the sample container as the sample was collected. A survey form was also used to note material type (surfacing, thermal, or misc.), and general condition of the suspect ACM and a map was made to identify locations of samples. Attempts were made to obtain representative samples of like materials as this is the most cost-effective method for the determination of ACM. It should be noted that inspection and bulk sampling of roofing materials and window caulk was included in the scope of inspection. Although Texas Consulting Services used care to obtain bulk samples, it is necessary to take a representative quantity of suspect materials. This results in a certain amount of unavoidable damage to these materials.

During the asbestos survey, the inspector (sampler) wore appropriate respiratory protection when necessary (29CFR. 1910 and 1926, and EPA - 560 OPTS-86-0001, A Guide to Respiratory Protection for the Asbestos Abatement Industry).

Sample analyses were conducted using polarized light microscopy (PLM) with diffusion staining as required by EPA method 600/M4-82-020.

Air sampling, if warranted, was performed using Phase Contrast Microscopic (PCM) as required by NIOSH-582 and NIOSH-7400 Revision 3 (effective 5/15/89).

5.0 Recommendations

The roof mastic was reported to contain asbestos.

Contractors working on the roof should be informed of the presence of asbestos in the mastic on penetrations and the roof edges.

This survey was conducted by an asbestos management planner accredited & licensed in the State of Texas, Mr. Steve Strong, DSHS License #205048.

TAB 2

LABORATORY RESULTS

CA Labs
Dedicated to Quality

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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
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Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036f, Calallen Stadium Visitor North F
Reference #: CAL25096961AS Date: 09/19/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

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Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

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Phone 225-751-5632
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Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036f, Calallen Stadium Visitor North RR **CA Labs Project #:** CAL25096961AS

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

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Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83049	036f-1		*1-1*	***CMU Mortar**/ white surfaced brown finishing plaster*	*n*	***None Detected***		100% qu,bi,ca
83049			*1-2*	*gray plaster*	*y*	***None Detected***		100% qu,ca
83050	036f-2		*2-1*	***CMU Mortar**/ white surfaced brown finishing plaster*	*n*	***None Detected***		100% qu,bi,ca
83050			*2-2*	*gray plaster*	*y*	***None Detected***		100% qu,ca
83051	036f-3		*3-1*	***CMU Mortar**/ white surfaced brown finishing plaster*	*n*	***None Detected***		100% qu,bi,ca
83051			*3-2*	*gray plaster*	*y*	***None Detected***		100% qu,ca
83052	036f-4		*4-1*	***Drywall**/ white compound*	*y*	***None Detected***		100% qu,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
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Phone 972-242-2754
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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Phone # 361-779-5064
Fax #

Customer Project:
25-036f, Calallen Stadium Visitor North RR

Turnaround Time:
3 Days

CA Labs Project #:
CAL25096961AS

Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83052			*4-2*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
83053	036f-5		*5-1*	***Drywall**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca
83053			*5-2*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
83054	036f-6		*6-1*	***Drywall**/ white surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Josh Strange
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
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7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	CA Labs Job #	CAL 25096961
Client Address:	103 Canal St.	Billing Address: (if different)	
	Mathis, Texas 78368		
Phone Number:	361-779-5064	P.O. #:	
Fax Number:		Project Name:	Calallen Stadium Visitor N RR
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 F

Contact: Steve Strong

Report Results: Via: Email ____ FAX ____ Verbal ____

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix: Air / Bulk / Water
6	6	Bulk

Please indicate appropriate turn around time.

Asbestos: *please call ahead for availability of all rush and/or after hours samples*

TEM	TA Time	PLM	TA Time	Optical / IAQ	TA Time
Circle analysis and select TA time		Circle analysis and select TA time	2 hour	**PCM**: NIOSH 7400	Note TAT
AHERA	4 hour	EPA 600	4 hour	**Allergen Particle**:	24 hour
EPA Level II	8 hour		8 hour	tape/bulk/swab	2 days
Drinking Water	16 hour		16 hour	Cyclex-d cassettes	3 days
Wipe	24 hour	AHERA	24 hour	Air-o-cell cassettes	5 days
Micro-vac	2 days		2 days	Anderson cultures	Specify
NIOSH 7402	3 days	Point Count -	3 days	Bulk/swab cultures	Mold or
Chatfield Bulk	5 days	(NESHAPS)	5 days	Bacteria cultures	bacteria

Lead: *Circle analysis and select TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater
TA Time:	8 hour	1 day	2 days	3 days	5 days

Sample Information:

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036F-1	CMU Mortar	9.16.25	
036F2	"		
036F3	"		
036F4	Drywall		
036F5	"		

Custody Information:

Samples relinquished: Steve Strong
Signature / Date / Time

Samples received: 10:30AM SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	**CA Labs Job #**	**CAL** 25096961
Client Address:	103 Canal St Mathis, TX 78368	Billing Address: (if different)	
Phone Number:	361-779-5064	P.O. # :	
Fax Number:		Project Name:	Calallen Stadium North LA
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 f

Total # Samples Submitted:	**Total # Samples to be Analyzed:**	**Material Matrix:**
6	6	Air / (Bulk) / Water

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036-6	Drywall	9.16.25	

Custody Information:

Samples relinquished: Steven Stanley 9-16-25
Signature / Date / Time

Samples received: 10:30AM SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

TAB 3

SAMPLE
LOCATIONS MAP

TEXAS CONSULTING SERVICES

*PO Box 610 * Mathis, Texas 78368*

*Phone: (361) 779-5064 * Fax: (432) 687-5456*

Email: stevestrong2a@yahoo.com

September 24, 2025

Project: Calallen Stadium Facilities
Calallen ISD
Corpus Christi, Texas
Attn: Blair McDavid
Email: bmcdavid@calallen.org
Phone: 361-242-5600

RE: Asbestos Inspection - South Visitor Restroom
4001 Wildcat Drive,
Corpus Christi, Texas

Mr. McDavid,

A thorough asbestos inspection was conducted at the Football Stadium South Visitor Restroom located at 4001 Wildcat Drive, Corpus Christi, Texas, on September 16 and 19, 2025. The sampling was conducted to allow renovations. Sampling of suspected materials discovered the following asbestos containing materials:

None of the materials observed and sampled were found to contain asbestos

The survey was completed by a Texas Department of State Health Services Licensed Management Planner, Mr. Steve Strong. If you have any questions regarding the information contained in this report, please contact our offices at your earliest convenience: (361) 779-5064.

Inspector Signature:

Sincerely,



Steve Strong

Certified Environmental Health Technician

TX Department of Licensing and Regulation Mold Assessment Consultant #MAC0334

TX Department of State Health Services Asbestos Management Planners' License #205048

TX Department of State Health Services Lead Inspector License #205048

TEXAS CONSULTING SERVICES
PO Box 610 * Mathis, Texas 78368
Phone: (361) 779-5064 * Fax: (432) 687-5456
Email: stevestrong2a@yahoo.com

ASBESTOS SURVEY REPORT FOR:

CLIENT:

Attn: Blair McDavid
Calallen ISD
Corpus Christi, Texas 78401

PROJECT SITE:

Football Stadium
South Visitor Restroom
4001 Wildcat Drive
Corpus Christi, Texas

INSPECTION DATE:
September 16 and 19, 2025
25-036g

INDEX

TAB 1 – ASBESTOS INSPECTION REPORT

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

TAB 1

ASBESTOS INSPECTION REPORT

TABLE OF CONTENTS

1.0 OVERVIEW

2.0 BUILDING DESCRIPTION

3.0 RESULTS OF SAMPLING FOR ACM

5.0 RECOMMENDATIONS

ADDITIONAL INFORMATION

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

ASBESTOS REPORT AND SUMMARY

SCOPE OF ASBESTOS INSPECTION

A. Texas Consulting Services will not be responsible for any asbestos containing materials (ACM) that were not found in the asbestos inspection of the site due to areas that were inaccessible or concealed. Since ACM inspection is limited to areas that are accessible to the inspector and not enclosed or otherwise concealed from the inspection process and additionally that non-destructive testing is performed during the inspection, the owner is advised that abatement or demolition may discover additional ACM on site. Unless stipulated in the project proposal, TCS does not perform exterior sampling for asbestos.

B. This inspection report is written based on the ACM inspection of the site and on the lab analysis of samples taken. The laboratories used are Department of State Health Services licensed and Texas Consulting Services assumes these analyses are true and correct but will not be responsible for their content.

C. Any damages done to the site will be the responsibility of the site owner. Some damage will occur as a part of the inspection process such as, but not limited to, floor tile, holes in walls, surfaces or pipes or other cosmetic damage. Texas Consulting Services will not be responsible for these damages.

D. Theft from the site will not be the responsibility of Texas Consulting Services.

E. This inspection is not a warranty as to the absence of ACM in the completed project.

F. Neither Texas Consulting Services, its employees or representatives have had, presently have, or contemplate having any interest in the subject property or are associated in any way with any party to this project.

1.0 Overview

A limited asbestos survey was performed by Texas Consulting Services on September 16 and 19, 2025, at the following project site: Football Stadium South Visitor Restroom at 4001 Wildcat Drive in Corpus Christi, Texas. Samples were taken of suspected interior materials (See 3.0 Table of Sampling Results).

The onsite structure was surveyed to determine the presence and Locations of ACM, if any, in the structure.

Asbestos in public buildings regulations were adopted under Art 4477-3A, Section 12 of the Texas Civil Statutes with enforcement authority given to the Texas Department of State Health Services.

The new regulations are very restrictive of who may perform asbestos-related activities. Building owners or their representatives should make sure that anyone doing asbestos work or consulting is licensed by the Texas Department of Health. All Texas Consulting Services personnel are licensed to perform a variety of asbestos related activities.

2.0 Building Description

The building has a slab foundation, built-up roof over concrete, drywall ceilings, and CMU interior/exterior walls.

3.0 Results of Sampling for ACM (Asbestos)

The inspector took 8 bulk asbestos samples, from which the laboratory analyzed 15 layers.

The chart of the samples collected with laboratory results for asbestos being obtained from the samples is below:

Table of Sample Results, Location, Condition, Amount

Calallen Stadium Facilities
South Visitor Restrooms
4001 Wildcat Drive
Corpus Christi, Texas

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative	1-1	036g-1-1	CMU Mortar Gray Surfaced Brown Finishing Compound	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1-2	036g-1-2	Gray Plaster						
Negative	1-1	036g-1-1	CMU Mortar Gray Surfaced Brown Finishing Compound	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1-2	036g-1-2	Gray Plaster						
Negative	1-1	036g-3-1	CMU Mortar Gray Surfaced Brown Finishing Compound	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1-2	036g-3-2	Gray Plaster						
Negative	2-1	036g-4-1	Tan Surfaced White Compound	Ceilings	N/A	G	Misc	F	None
Negative	2-2	036g-4-2	White Joint Compound Under Tape						
Negative	2-3	036g-4-3	White Drywall With Brown Paper						
Negative	2-1	036g-5-1	Tan Surfaced White Compound	Ceilings	N/A	G	Misc	F	None
Negative	2-2	036g-5-2	White Joint Compound Under Tape						
		036g-5-3	White Drywall With Brown Paper						
Negative	2	036g-6	White Surfaced Compound	Ceilings	N/A	G	Misc	F	None
Negative	5	036k-7	Roof Mastic	Built Up Roof	N/A	G	Misc	NF	None
Negative	6	036k-8	Roof Field	Built Up Roof	N/A	G	Misc	NF	None

TSI – Thermal System Insulation
Surf – Surfacing
Misc – Miscellaneous
HA – Homogeneous Area

G – Good condition
D – Damaged
S – Significantly damaged

4.0 Sampling and Analysis Protocols

A discreet sample of each suspect ACM was obtained (if warranted) and placed into individual sample containers. Three samples of each homogenous material are required by DSHS regulations. Surfacing materials require 3, 5, or 7 samples according to the square footage present. The locations were noted on the survey form and assigned an individual laboratory identification number. This number was affixed to the sample container as the sample was collected. A survey form was also used to note material type (surfacing, thermal, or misc.), and general condition of the suspect ACM and a map was made to identify locations of samples. Attempts were made to obtain representative samples of like materials as this is the most cost-effective method for the determination of ACM. It should be noted that inspection and bulk sampling of roofing materials and window caulk was included in the scope of inspection. Although Texas Consulting Services used care to obtain bulk samples, it is necessary to take a representative quantity of suspect materials. This results in a certain amount of unavoidable damage to these materials.

During the asbestos survey, the inspector (sampler) wore appropriate respiratory protection when necessary (29CFR. 1910 and 1926, and EPA - 560 OPTS-86-0001, A Guide to Respiratory Protection for the Asbestos Abatement Industry).

Sample analyses were conducted using polarized light microscopy (PLM) with diffusion staining as required by EPA method 600/M4-82-020.

Air sampling, if warranted, was performed using Phase Contrast Microscopic (PCM) as required by NIOSH-582 and NIOSH-7400 Revision 3 (effective 5/15/89).

5.0 Recommendations

No asbestos was identified in any of the samples.

Work may proceed without asbestos concerns.

This survey was conducted by an asbestos management planner accredited & licensed in the State of Texas, Mr. Steve Strong, DSHS License #205048.

TAB 2

LABORATORY RESULTS

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
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Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036g, Calallen Stadium Visitor RR S.
Reference #: CAL25096960AS Date: 09/19/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
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12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036g, Calallen Stadium Visitor RR S. **CA Labs Project #:** CAL25096960AS

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate	pe - perlite	fg - fiberglass	pa - palygorskite (clay)
gypsum - gypsum	qu - quartz	mw - mineral wool	
bi - binder		wo - wollastinite	
or - organic		ta - talc	
ma - matrix		sy - synthetic	
mi - mica		ce - cellulose	
ve - vermiculite		br - brucite	
ot - other		ka - kaolin (clay)	

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

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Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Phone # 361-779-5064
Fax #

Attn: Steve Strong

Customer Project:
25-036g, Calallen Stadium Visitor RR S.
Turnaround Time:
3 Days

CA Labs Project #:
CAL25096960AS
Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83043	036g-1		1-1	***CMU Mortar**/ gray surfaced brown finishing compound*	n	***None Detected***		100% qu,bi,ca
83043			1-2	*white stucco*	y	***None Detected***		100% qu,bi,ca
83044	036g-2		2-1	***CMU Mortar**/ brown finishing compound*	y	***None Detected***		100% qu,ca
83044			2-2	*white stucco*	y	***None Detected***		100% qu,bi,ca
83045	036g-3		3-1	***CMU Mortar**/ gray surfaced brown finishing compound*	n	***None Detected***		100% qu,bi,ca
83045			3-2	*white and gray stucco*	n	***None Detected***		100% qu,bi,ca
83046	036g-4		4-1	***Drywall**/ white compound*	y	***None Detected***		100% qu,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Tomas Vazquez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
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4. Layer not analyzed - attached to previous positive layer and contamination is suspected
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Polarized Light Asbestiform Materials Characterization

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Turnaround Time:
3 Days

CA Labs Project #:
CAL25096960AS
Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83046			*4-2*	*white compound (beneath tape)*	*y*	***None Detected***		100% qu,ca
83046			*4-3*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
83047	036g-5		*5-1*	***Drywall**/ white surfaced white compound*	*y*	***None Detected***		100% qu,bi,ca
83047			*5-2*	*white compound (beneath tape)*	*y*	***None Detected***		100% qu,ca
83047			*5-3*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
83048	036g-6		*6-1*	***Drywall**/ white surfaced white compound*	*y*	***None Detected***		100% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Tomas Vazquez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	CA Labs Job #	CAL 25096960
Client Address:	103 Canal St.	Billing Address: (if different)	
	Mathis, Texas 78368		
Phone Number:	361-779-5064	P.O. #:	
Fax Number:		Project Name:	Calallen Stadium @ Visitor, LR S.
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 B

Contact: Steve Strong

Report Results: Via: Email ____ FAX ____ Verbal

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix: Air / (Bulk) / Water
6	6	

Please indicate appropriate turn around time.

Asbestos: *please call ahead for availability of all rush and/or after hours samples*

TEM	TA Time	PLM	TA Time	Optical / IAQ	TA Time
Circle analysis and select TA time		Circle analysis and select TA time	2 hour	**PCM**: NIOSH 7400	Note TAT
AHERA	4 hour	EPA 600	4 hour	**Allergen Particle**:	24 hour
EPA Level II	8 hour		8 hour	tape/bulk/swab	2 days
Drinking Water	16 hour		16 hour	Cyclex-d cassettes	3 days
Wipe	24 hour	AHERA	24 hour	Air-o-cell cassettes	5 days
Micro-vac	2 days		2 days	Anderson cultures	Specify
NIOSH 7402	3 days	Point Count -	3 days	Bulk/swab cultures	Mold or
Chatfield Bulk	5 days	(NESHAPS)	5 days	Bacteria cultures	bacteria

Lead: *Circle analysis and select TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater
TA Time:	8 hour	1 day	2 days	3 days	5 days

Sample Information:

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036G-1	CMU mortar	9-16-25	
036G-2	CMU Mortar		
036G-3	CMU Mortar		
036G-4	Dry wall		
036G-5	Dry wall		

Custody Information:

Samples relinquished: Steve Strong 4-18-25 — Signature / Date / Time

Samples received: 10:30AM SEP 17 2025 — Signature / Date / Time

Samples relinquished: — Signature / Date / Time

Samples received: — Signature / Date / Time

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	**CA Labs Job #**	**CAL** 25096960
Client Address:	103 Canal St Mathis, TX 78368	Billing Address: (if different)	
Phone Number:	361-779-5064	P.O. # :	Visitor
Fax Number:		Project Name:	Calallen Stadium Visitor RTS
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 G

Total # Samples Submitted:	**Total # Samples to be Analyzed:**	**Material Matrix:**
6	6	Air / Bulk / Water

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036G6	Drywall	9-16-25	

Custody Information:

Samples relinquished: Steve Strong 9-16-25
Signature / Date / Time

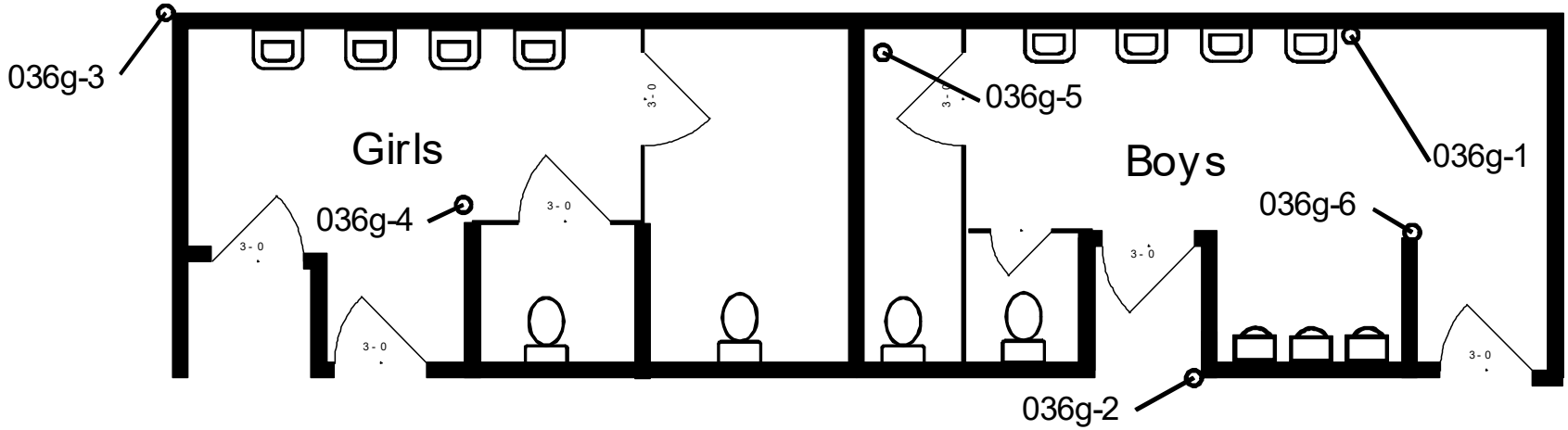
Samples received: 10:30AM SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

TAB 3

SAMPLE
LOCATIONS MAP



Visitor South Restrooms

TEXAS CONSULTING SERVICES

*PO Box 610 * Mathis, Texas 78368*

*Phone: (361) 779-5064 * Fax: (432) 687-5456*

Email: stevestrong2a@yahoo.com

September 24, 2025

Project: Visitor Concession
Calallen ISD
Corpus Christi, Texas
Attn: Blair McDavid
Email: bmcdavid@calallen.org
Phone: 361-242-5600

RE: Asbestos Inspection - Visitor Concession
4001 Wildcat Drive,
Corpus Christi, Texas

Mr. McDavid,

A thorough asbestos inspection was conducted at the Football Stadium Visitor Concession Stand located at 4001 Wildcat Drive, Corpus Christi, Texas, on September 24, 2025. The sampling was conducted to allow renovation. Sampling of suspected materials discovered the following asbestos containing materials:

None of the materials observed and sampled were found to contain asbestos

The survey was completed by a Texas Department of State Health Services Licensed Management Planner, Mr. Steve Strong. If you have any questions regarding the information contained in this report, please contact our offices at your earliest convenience: (361) 779-5064.

Inspector Signature:

Sincerely,



Steve Strong

Certified Environmental Health Technician

TX Department of Licensing and Regulation Mold Assessment Consultant #MAC0334

TX Department of State Health Services Asbestos Management Planners' License #205048

TX Department of State Health Services Lead Inspector License #205048

TEXAS CONSULTING SERVICES
PO Box 610 * Mathis, Texas 78368
Phone: (361) 779-5064 * Fax: (432) 687-5456
Email: stevestrong2a@yahoo.com

ASBESTOS SURVEY REPORT FOR:

CLIENT:

Attn: Blair McDavid
Calallen ISD
Corpus Christi, Texas 78401

PROJECT SITE:

Football Stadium
Visitor Concession Stand
4001 Wildcat Drive
Corpus Christi, Texas

INSPECTION DATE:
September 24, 2025
TCS Project No. 25-036h

INDEX

TAB 1 – ASBESTOS INSPECTION REPORT

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

TAB 1

ASBESTOS INSPECTION REPORT

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1.0 OVERVIEW

2.0 BUILDING DESCRIPTION

3.0 RESULTS OF SAMPLING FOR ACM

5.0 RECOMMENDATIONS

ADDITIONAL INFORMATION

TAB 2 – LABORATORY RESULTS

TAB 3 – SAMPLE LOCATIONS MAP

ASBESTOS REPORT AND SUMMARY

SCOPE OF ASBESTOS INSPECTION

A. Texas Consulting Services will not be responsible for any asbestos containing materials (ACM) that were not found in the asbestos inspection of the site due to areas that were inaccessible or concealed. Since ACM inspection is limited to areas that are accessible to the inspector and not enclosed or otherwise concealed from the inspection process and additionally that non-destructive testing is performed during the inspection, the owner is advised that abatement or renovation may discover additional ACM on site. Unless stipulated in the project proposal, TCS does not perform exterior sampling for asbestos.

B. This inspection report is written based on the ACM inspection of the site and on the lab analysis of samples taken. The laboratories used are Department of State Health Services licensed and Texas Consulting Services assumes these analyses are true and correct but will not be responsible for their content.

C. Any damages done to the site will be the responsibility of the site owner. Some damage will occur as a part of the inspection process such as, but not limited to, floor tile, holes in walls, surfaces or pipes or other cosmetic damage. Texas Consulting Services will not be responsible for these damages.

D. Theft from the site will not be the responsibility of Texas Consulting Services.

E. This inspection is not a warranty as to the absence of ACM in the completed project.

F. Neither Texas Consulting Services, its employees or representatives have had, presently have, or contemplate having any interest in the subject property or are associated in any way with any party to this project.

1.0 Overview

A limited asbestos survey was performed by Texas Consulting Services on September 24, 2025, at the following project site: Football Stadium Visitor Concession Stand at 4001 Wildcat Drive in Corpus Christi, Texas. Samples were taken of suspected interior materials (See 3.0 Table of Sampling Results).

The onsite structure was surveyed to determine the presence and Locations of ACM, if any, in the structure.

Asbestos in public buildings regulations were adopted under Art 4477-3A, Section 12 of the Texas Civil Statutes with enforcement authority given to the Texas Department of State Health Services.

The new regulations are very restrictive of who may perform asbestos-related activities. Building owners or their representatives should make sure that anyone doing asbestos work or consulting is licensed by the Texas Department of Health. All Texas Consulting Services personnel are licensed to perform a variety of asbestos related activities.

2.0 Building Description

The building has a slab foundation, built-up roof over concrete, drywall ceiling in the main wing, and CMU interior/exterior walls.

3.0 Results of Sampling for ACM (Asbestos)

The inspector took 10 bulk asbestos samples, from which the laboratory analyzed 12 layers.

The chart of the samples collected with laboratory results for asbestos being obtained from the samples is below:

Table of Sample Results, Location, Condition, Amount

Visitor Concession
4001 Wildcat Drive
Corpus Christi, Texas

Results	HA #	Sample Numbers	Material and Description	Material Location	Amount	Condition	Material Type	Friable/ Non Fri	Response Action
Negative	1	036h-1	CMU Mortar White Stucco	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036h-1	CMU Mortar White Stucco	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	1	036h-1	CMU Mortar White Stucco	Walls, interior/exterior	N/A	G	Misc	NF	None
Negative	2	036h-4-3	Sink Undercoat Gray Sealant	Stainless Steel Sinks	N/A	G	Misc	NF	None
Negative	2	036h-5	Sink Undercoat Gray Sealant	Stainless Steel Sinks	N/A	G	Misc	NF	None
Negative	2	036h-6	Sink Undercoat Gray Sealant	Stainless Steel Sinks	N/A	G	Misc	NF	None
Negative Negative	3-1 3-2	036h-7	Drywall White Finished Compound White Drywall With Brown Paper	Sink Undercoating	N/A	G	Misc	NF	None
Negative Negative	3-1 3-2	036h-8	Drywall White Finished Compound White Drywall With Brown Paper	Sink Undercoating	N/A	G	Misc	NF	None
Negative	3	036h-9	Drywall White Finished Compound	Sink Undercoating	N/A	G	Misc	NF	None
Negative	4	036h-10	Roof Field Shingle With Gray Gravel	Flat Roof	N/A	G	Misc	NF	None
Negative	5	036h-11	Penetration Mastic Black Tar	Vents, Roof	N/A	G	Misc	NF	None
Negative	6	Not Sampled	Ceiling of Kitchen	Concrete	N/A	G	Misc	NF	None

TSI – Thermal System Insulation
Surf – Surfacing
Misc – Miscellaneous
HA – Homogeneous Area

G – Good condition
D – Damaged
S – Significantly damaged

4.0 Sampling and Analysis Protocols

A discreet sample of each suspect ACM was obtained (if warranted) and placed into individual sample containers. Three samples of each homogenous material are required by DSHS regulations. Surfacing materials require 3, 5, or 7 samples according to the square footage present. The locations were noted on the survey form and assigned an individual laboratory identification number. This number was affixed to the sample container as the sample was collected. A survey form was also used to note material type (surfacing, thermal, or misc.), and general condition of the suspect ACM and a map was made to identify locations of samples. Attempts were made to obtain representative samples of like materials as this is the most cost-effective method for the determination of ACM. It should be noted that inspection and bulk sampling of roofing materials and window caulk was included in the scope of inspection. Although Texas Consulting Services used care to obtain bulk samples, it is necessary to take a representative quantity of suspect materials. This results in a certain amount of unavoidable damage to these materials.

During the asbestos survey, the inspector (sampler) wore appropriate respiratory protection when necessary (29CFR. 1910 and 1926, and EPA - 560 OPTS-86-0001, A Guide to Respiratory Protection for the Asbestos Abatement Industry).

Sample analyses were conducted using polarized light microscopy (PLM) with diffusion staining as required by EPA method 600/M4-82-020.

Air sampling, if warranted, was performed using Phase Contrast Microscopic (PCM) as required by NIOSH-582 and NIOSH-7400 Revision 3 (effective 5/15/89).

4.1 Types of Asbestos

Each type of asbestos displays unique characteristics when subjected to microscopic examination. Percentages of the identified types of asbestos are determined by visual estimation. Even though this is estimation, any material that contains over one-percent (1%) of any type of asbestos is considered ACM and must be handled according to Texas DSHS, OSHA, and EPA regulations if disturbed. If undisturbed, the material must be handled under an Operations and Maintenance Plan.

4.2 Categories of Asbestos Containing Material (ACM)

Typical building materials that contain asbestos are found in a variety of types and uses. The conditions in which ACM is found are **friable** and **non-friable**. Friable meaning the material can be crumbled, pulverized, or reduced to powder by hand pressure when dry. Non-friable cannot be crumbled, pulverized, or reduced to powder by hand pressure. A good example of friable ACBM is insulation around pipes. Non-friable ACBM examples are floor tile and plaster.

ACM is classed as a **surfacing, thermal** and **miscellaneous category I & II**. Surfacing is sprayed or troweled-on material, thermal is temperature or temperature control Material, misc. Category I is floor covering, roofing, packing and gaskets, and misc. category II is all other misc. material.

Various damage categories are assigned to asbestos such as **PD**- potential damage, **PSD** - potential significant damage, **D**- damage, **SD**- significant damage.

4.2.1 Ceiling Tiles and Spray-on Acoustic

Due to the excellent acoustic and binding properties of asbestos fibers, ceiling tiles may contain asbestos. Approximately two (2%) percent of all ceiling tiles manufactured before 1975 contained asbestos. Dropped ceiling tiles (including spline ceilings), lay-in tiles, and ceiling tiles that are adhered to a ceiling substrate may contain asbestos. In addition, the glues or adhesives used to attach these materials often contain asbestos fibers as a binding agent. Ceiling tiles found in an undamaged condition are classified as non-friable.

4.2.2 Wallboard, Plaster, Tape & Bedding Joints

Some types of wallboard including sheetrock and plaster can contain asbestos. This is not common but can be found in older installations. Asbestos fibers are more common in plaster where it is used as a binding agent. Tape and bedding used to join wallboard has also been found to contain small percentages of asbestos. Adhesives used to apply decorative wall coverings and paneling commonly contains asbestos as a binding agent.

4.2.3 Transite

Transite is a cementitious asbestos product that is non-friable. It is used for sewer and water pipe, miscellaneous piping, louvers, vent pipe, and materials where strength and temperature resistance are required.

4.2.4 Thermal Insulation

Asbestos Thermal System Insulation is used where heat resistance properties are important. Due to this property, it is very common in insulation installed prior to 1978. Almost all thermal insulation would be considered friable and as such is subject to the most damage. This is also due to its condensation control in HVAC systems. Usage in these systems includes pipe lagging, pipe wrap, block, blanket, cements and muds.

4.2.5 Floor Coverings

Asbestos has been used in floor coverings since before 1950. More recent floor coverings (post-1978) are less likely to contain asbestos. The majority of floor covering is non-friable, and is therefore less likely to release fibers into the air. Under Texas law, floor tile is handled differently that other types of ACBM. Your consultant can give more specifics if needed. The mastic used to glue flooring in place can also have asbestos as a binder. The 9-inch by 9-inch floor tile is more likely to have asbestos than the 12 inch by 12-inch variety.

5.0 Recommendations

No asbestos was identified in any of the samples.

Work may proceed without asbestos concerns.

This survey was conducted by an asbestos management planner accredited & licensed in the State of Texas, Mr. Steve Strong, DSHS License #205048.

TAB 2

LABORATORY RESULTS

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong
Customer Project: 25-036h, Calallen Stadium Visitor Conce
Reference #: CAL25096959AS Date: 09/19/25

Analysis and Method

Summary of polarized light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of a stereomicroscope. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may contain trace amounts of actinolite/tremolite. When not detected by PLM, these samples should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may contain a regulated asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Since allowable variation in quantification of samples close to 1% is high, <1% may be reported. Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos or "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). CA Labs is also accredited by AIHA LAP, LLC. in the PLM asbestos field of testing for Industrial Hygiene. All analysts have completed college courses or hold a degree in a natural science (geology, biology, or environmental science). Recognition by a state professional board in one these disciplines is preferred, but not required. Extensive in-house training programs are used to augment the educational background of the analyst. The Laboratory Director and Quality Manager have received supplemental McCrone Research training for asbestos identification. Analysis performed at Crisp Analytical Labs, LLC 1929 Old Denton Road Carrollton, TX 75006

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project: 25-036h, Calallen Stadium Visitor Concession **CA Labs Project #:** CAL25096959AS

Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types

No Asbestos Detected.

Sample 10 was missing from the bag.

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

CA Labs
Dedicated to Quality

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1929 Old Denton Road
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Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036h, Calallen Stadium Visitor Concession

CA Labs Project #:
CAL25096959AS

Turnaround Time:
3 Days

Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025
Purchase Order #:

Phone # 361-779-5064
Fax #

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83033	036h-1		1-1	***CMU Mortar**/ gray surfaced white stucco*	n	***None Detected***		100% qu,bi,ca
83034	036h-2		2-1	***CMU Mortar**/ gray surfaced white stucco*	n	***None Detected***		100% qu,bi,ca
83035	036h-3		3-1	***CMU Mortar**/ tan surfaced white stucco*	n	***None Detected***		100% qu,bi,ca
83036	036h-4		4-1	***Sink Undercoat**/ gray sealant*	y	***None Detected***		100% qu,gy,bi
83037	036h-5		5-1	***Sink Undercoat**/ gray sealant*	y	***None Detected***		100% qu,gy,bi
83038	036h-6	***5***	6-1	***Sink Undercoat**/ black sealant*				
83039	036h-7		7-1	***Drywall**/ tan surfaced white compound*	n	***None Detected***		100% qu,bi,ca

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Tomas Vazquez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
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Phone 225-751-5632
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Polarized Light Asbestiform Materials Characterization

Customer Info:
Strong Consulting
103 Canal St
Mathis, TX 78368

Attn: Steve Strong

Customer Project:
25-036h, Calallen Stadium Visitor Concession

CA Labs Project #:
CAL25096959AS

Turnaround Time:
3 Days

Date: 9/19/2025
Samples Rec'd: 9/17/25 10:30AM
Date Of Sampling: 9/16/2025

Phone # 361-779-5064
Fax #

Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
83039			*7-2*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
83040	036h-8		*8-1*	***Drywall**/ tan surfaced white compound*	*n*	***None Detected***		100% qu,bi,ca
83040			*8-2*	*white drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy
83041	036h-9		*9-1*	***Drywall**/ tan drywall with brown paper*	*n*	***None Detected***	20% ce	80% qu,gy

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). *All samples received in good condition unless noted.*
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Tomas Vazquez
Analyst

Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
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4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	CA Labs Job #	CAL 25096959
Client Address:	103 Canal St.	Billing Address: (if different)	
	Mathis, Texas 78368		
Phone Number:	361-779-5064	P.O. #:	
Fax Number:		Project Name:	Calallen Stadium Visitor Concession
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 h

Contact: Steve Strong Report Results: Via: Email ____FAX____Verbal

Total # Samples Submitted:	Total # Samples to be Analyzed:	Material Matrix: Air / (Bulk) / Water

Please indicate appropriate turn around time.

Asbestos: *please call ahead for availability of all rush and/or after hours samples*

TEM	TA Time	PLM	TA Time	Optical / IAQ	TA Time
Circle analysis and select TA time		Circle analysis and select TA time	2 hour	**PCM**: NIOSH 7400	Note TAT
AHERA	4 hour	(EPA 600)	4 hour	**Allergen Particle**:	24 hour
EPA Level II	8 hour		8 hour	tape/bulk/swab	2 days
Drinking Water	16 hour		16 hour	Cyclex-d cassettes	3 days
Wipe	24 hour	AHERA	24 hour	Air-o-cell cassettes	5 days
Micro-vac	2 days		2 days	Anderson cultures	Specify
NIOSH 7402	3 days	Point Count -	(3 days)	Bulk/swab cultures	Mold or
Chatfield Bulk	5 days	(NESHAPS)	5 days	Bacteria cultures	bacteria

Lead: *Circle analysis and select TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater
TA Time:	8 hour	1 day	2 days	3 days	5 days

Sample Information:

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036h-1	CMU Mortar	9-16-25	
036h-2	"	"	
036h-3	"	"	
036h-4	Sink Undercoat	"	
036h-5	"	"	

Custody Information:

Samples relinquished: Steve Strong 9/16/25 — Signature / Date / Time

Samples received: 10:30AM SEP 17 2025 — Signature / Date / Time

Samples relinquished: — Signature / Date / Time

Samples received: — Signature / Date / Time

CA Labs

CA Labs
1929 Old Denton Rd.
Carrollton, TX 75006

Phone: 972-242-2754
Fax: 972-242-2798
Mobile: 469-222-6967

Chain of Custody

Client Name:	Texas Consulting Services	**CA Labs Job #**	**CAL** 25096959
Client Address:	103 Canal St Mathis, TX 78368	Billing Address: (if different)	
Phone Number:	361-779-5064	P.O. # :	
Fax Number:		Project Name:	Calallen Stadium Visitor Concession
Send Reports to:	stevestrong2a@yahoo.com	Project Number:	25-036 h

Total # Samples Submitted:	**Total # Samples to be Analyzed**:	**Material Matrix:** Air / Bulk / Water

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L):
036h-6	Sink Undercoat	9-16-25	
036h-7	Dry wall		
036h-8			
036h-9			
036h-10			

Custody Information:

Samples relinquished: Steve Strong 9-16-25
Signature / Date / Time

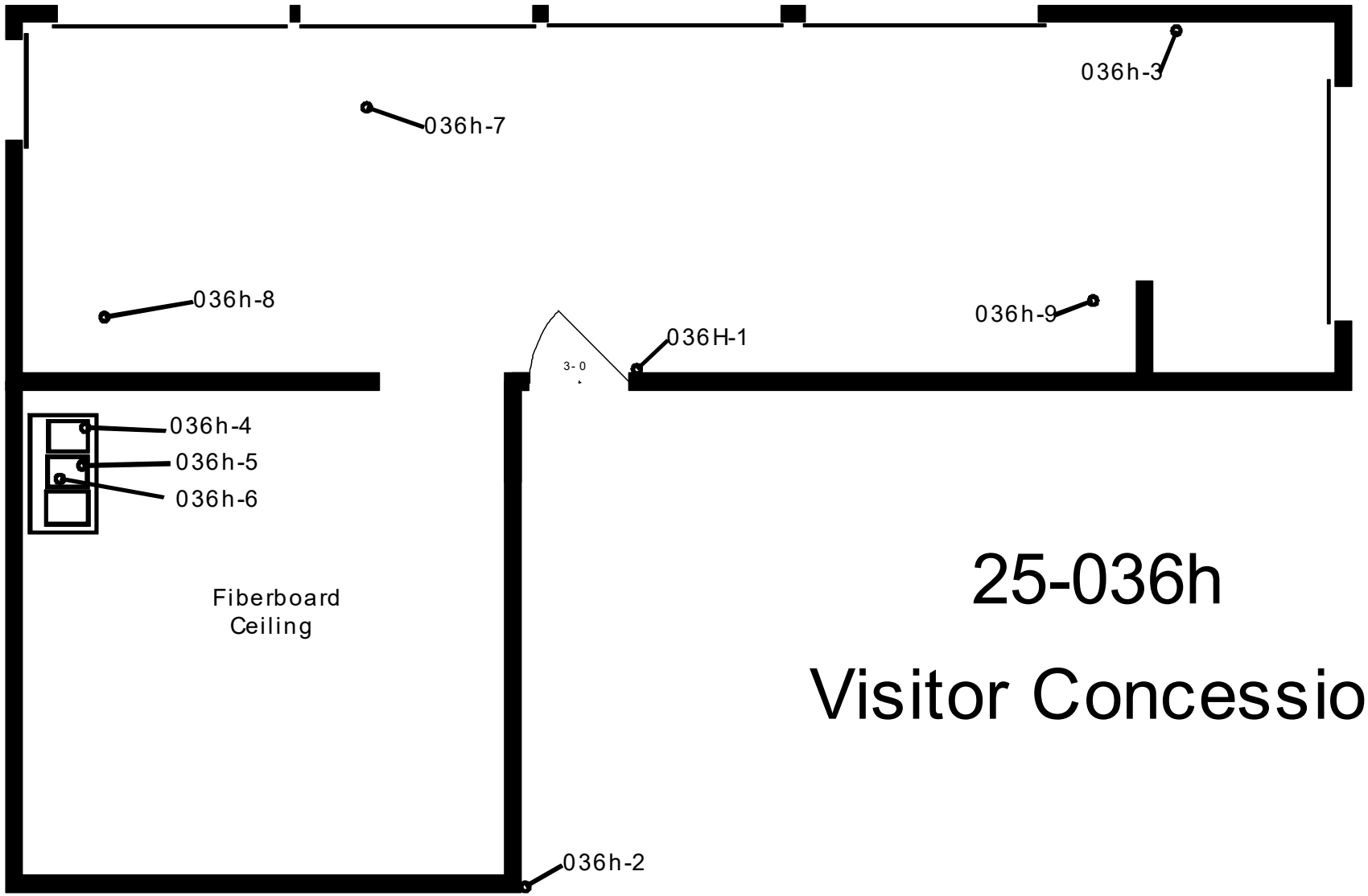
Samples received: 10:30AM SEP 17 2025
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

TAB 3

SAMPLE
LOCATIONS MAP



25-036h

Visitor Concession

SECTION 03 10 00 - CONCRETE FORMWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

The work of this section includes all labor, materials and equipment required to form all cast-in-place concrete shown on the drawings including but not limited to all slabs, joists, beams, walls, stairs, and equipment pads.

1.3 CODES AND STANDARDS

Comply with the provision of the following codes, specifications and standards except where more stringent requirements are shown or specified:

A. ACI 301 "Specifications for Structural Concrete for Buildings"

B. ACI 318 "Building Code Requirements for Reinforced Concrete"

C. Concrete Reinforcing Steel Institute "Reinforced Concrete, Manual of Standard Practice"

D. ACI SP-4 "Formwork for Concrete"

In addition, all formwork shall be designed, erected, supported, braced, and maintained as a minimum according to ACI Standard 347 "Guide to Formwork".

1.4 RESPONSIBILITY

The design, construction and safety of all formwork shall be the responsibility of the General Contractor. The Contractor shall also be responsible for determining when temporary supports, shores, backshores, and other bracing may be safely removed.

PART 2 - PRODUCTS

2.1 FORMS FOR EXPOSED FINISH CONCRETE

Unless otherwise specified, formwork for exposed concrete surfaces shall consist of plywood, metal, metal framed plywood, or other acceptable surface. Formwork shall provide a continuous straight and smooth surface conforming to the joint system as specified on the Architect's drawings. Form material shall have sufficient thickness to withstand pressure of concrete without bow or deflection. Plywood shall be overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid

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Concrete Form", Class I, or plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge sealed, with each piece bearing legible inspection trademark.

2.2 FORMS FOR UNEXPOSED FINISH CONCRETE

Unless otherwise specified, formwork for unexposed concrete surfaces shall be constructed with plywood, lumber, metal or other acceptable material. Lumber shall be dressed on at least two edges and one side for tight fit.

2.3 FORMWORK COATINGS

Formwork coatings shall be a commercial formulation that will not bond with, stain, nor adversely affect concrete surfaces or impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede curing with water or curing compounds. Provide a product that has a maximum VOC (Volatile Organic Compounds) of 350 mg/l but not greater than permitted by the local government agency having jurisdiction in the area where the project is located.

2.4 NAILS AND FASTENERS

Use only galvanized nails and fasteners for securing formwork in structures exposed to weather or unconditioned spaces such as garages, canopies and porte-cocheres.

PART 3 - EXECUTION

3.1 FABRICATION AND CONSTRUCTION

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347.

B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

C. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming

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keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and patch forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

G. Form Ties:

Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is 1 1/2" inside concrete and will not leave holes larger than 1" diameter in concrete surface. Provide only galvanized form ties in structures exposed to weather or unconditioned spaces.

H. Provisions for Other Trades:

Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

3.2 CLEANING AND TIGHTENING

Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and all other debris just prior to concrete placement. Retighten forms and bracing prior to concrete placement as required to prevent mortar leaks and maintain proper alignment.

3.3 CLEANING AND RE-USE OF FORMS

Forms reused in the work shall be repaired and cleaned. Split, frayed, delaminated, or otherwise damaged facing material will not be acceptable for exposed surfaces. Forms intended for successive concrete placement shall have surfaces cleaned, fins and laitance removed, and joints tightened to avoid surface offsets. New form coating compound shall be applied to reused forms. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

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3.4 TOLERANCES

Unless specified otherwise, all tolerances for concrete formwork shall conform to ACI Standard 117, "Standard Tolerances for Concrete Construction and Materials". Before concrete placement the Contractor shall check lines and levels of erected formwork and make any corrections and adjustments as required to ensure proper size and location of concrete members and stability of forming systems. During concrete placement the Contractor shall check formwork and supports to ensure that forms have not displaced and that completed work will be within specified tolerances.

3.5 SHORES AND SUPPORTS

A. Definitions

1. Shores: Vertical or inclined support members designed to carry the weight of formwork, concrete, and construction loads above.

2. Reshores: Shores placed snugly under a stripped concrete structural member after the original forms and shores have been removed from the member, thus requiring the member to carry its own weight and superimposed construction loads at the time of installation. Reshores are assumed to carry no load at the time of installation. After the installation of reshores, superimposed construction loads are assumed to be distributed among all members connected by reshores.

3. Backshores: Shores placed snugly under a stripped concrete structural member after the original formwork and shores have been removed from a small area without allowing the structural member to deflect or support its own weight or superimposed construction loads. It is assumed that backshores carry the same load as that carried by the original shores they replace.

Comply with ACI 347 for shoring, reshoring and backshoring in concrete construction and as herein specified where more stringent:

B. Structures with Three Supported Levels or Less:

Extend shoring from soil supported slab or suitable subgrade to uppermost level for structures with three structurally supported levels or less.

3.6 REMOVAL OF FORMS AND SUPPORTS

A. Curing and Stripping Concrete Cylinders:

The General Contractor shall be responsible for making and curing stripping concrete cylinders, cured under field conditions, for the purpose of determining concrete strength at time of form and shore removal. Such cylinders shall be made by the Contractor and tested by his testing laboratory.

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B. Formwork Not Supporting Concrete:

Formwork not supporting concrete such as sides of beams, walls, columns and similar parts of the structure, may be removed after cumulatively (not necessarily consecutively) curing at not less than 50°F for 12 hours after placing concrete, provided the concrete is sufficiently hard so as not to be damaged by form removal operations and provided curing and protection operations are maintained. If ambient air temperatures remain below 50°F or if retarding agents are used, then this specified minimum period should be increased as required to safely remove the forms without damage to the concrete. Where such forms also support formwork for slab or beam soffits, the removal times of the latter shall govern.

END OF SECTION 03 10 00

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SECTION 03 11 13.11
CONCRETE FORMS

PART 1 - GENERAL
1.01 Description
A. This specification shall govern work required for the installation and removal of Concrete Forms as required to complete the project.

1.02 References *The latest edition of the referenced item below shall be used.*
A. American Concrete Institute
B. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 420, Concrete Structures

1.03 Submittals
A. Forming plans shall be submitted to the Owner for review as specified.

PART 2 - PRODUCTS
2.01 General
A. Forms may be of either wood or metal, except where otherwise specified or directed by the Owner.
B. Forms shall be straight, free from warp, and of a depth equal to the thickness of the finished work.
C. Forms shall be practically mortar-tight, rigidly braced and strong enough to prevent bulging between supports and maintained to the proper line and grade during concrete placement.

2.02 Form Design and Form Plans
A. Forms shall be designed for the pressure exerted by a liquid weighing 150 pounds per cubic foot.
   1. The rate of placing the concrete shall be taken into consideration in determining the depth of the equivalent liquid.
B. For job-fabricated forms, an additional live load of fifty pounds per square foot (50 psf) shall be allowed on horizontal surfaces.
C. Commercially produced structural units used in formwork shall not exceed the manufacturer's maximum allowable working load for moment, shear or end reaction.
D. The maximum working load shall include a live load of thirty-five pounds per square foot (35 psf) of horizontal form surface and sufficient details and data shall be submitted for use in checking formwork details for approval.
E. Forming plans shall be submitted to the Owner for approval when specified.

2.03 Wood Forms
A. Lumber
   1. Lumber for forms shall be properly seasoned, of good quality, and free from imperfections which would affect its strength or impair the finished surface of the concrete.
   2. The lumber used for facing or sheathing shall be finished on at least one (1) side and two (2) edges and shall be sized to uniform thickness.
B. Plywood
   1. Forms may be constructed of plywood not less than one-half inch (1/2”) in thickness, with no form lining required.
   2. The grain of the face plies on plywood forms shall be placed parallel to the span between the supporting studs or joists.
   3. Plywood used for forming surfaces which remain exposed shall be equal to that specified as B-B Plyform Class I or Class II.
C. Reuse of Lumber or Plywood Forms

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1. Forms or form lumbers to be reused shall be maintained clean and in good condition.
2. Any lumber or plywood which is split, warped, bulged, marred or has defects that will produce inferior work shall not be used and, if condemned, shall be promptly removed from the work.

D. Liner
1. Form lining will be required for all formed surfaces, except for the inside of culvert barrels, inlets and manholes; surfaces that are subsequently covered by backfill material or are completely enclosed; and, any surface formed by a single finished board.
2. Lining will not be required when plywood forms are used.
3. Form lining shall be of an approved type such as Masonite or plywood.
4. Thin membrane sheeting, such as polyethylene sheets, shall not be used for form lining.

2.04 Metal Forms

A. The foregoing requirements for timber forms as regard to design, mortar-tightness, filleted corners, beveled projections, bracing, alignment, removal, reuse and wetting shall also apply to metal forms, except that these will not require lining, unless specifically noted on the plans.
B. The thickness of form metal shall be as required to maintain the true shape without warping or bulging.
C. All bolt and rivet heads on the facing sides shall be countersunk.
D. Clamps, pins or other connecting devices shall be designed to hold the forms rigidly together and to allow removal without injury to the concrete.
E. Metal forms which do not present a smooth surface or line up properly shall not be used.
F. Metal shall be kept free from rust, grease or other foreign materials.

2.05 Molding

A. Molding specified for chamfer strips or other uses shall be made of materials of a grade that will not split when nailed and which can be maintained to a true line without warping.
B. Wood molding shall be mill cut and dressed on all faces.
C. Unless otherwise provided, forms shall be filleted at all sharp corners and edges with triangular chamfer strips measuring three-fourths inch (3/4”) on the sides.

2.06 Metal Form Ties

A. Metal form ties of an approved type or a satisfactory substitute shall be used to hold forms in place and shall be of a type that permits ease of removal of the metal as hereinafter specified.
B. Devices holding metal ties in place shall be capable of developing the strength of the tie and adjustable to allow for proper alignment.

2.07 Form Removal Coating

A. Shall be oil or other bond breaking coating of such composition that it will not discolor or otherwise injuriously affect the concrete surface, which is approved by the Owner.

PART 3 - EXECUTION

3.01 General Information

A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
1. In the event that a requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.

3.02 Supports

A. Studs and joists shall be spaced so that the facing form material remains in true alignment under the imposed loads.

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B. Shall be securely staked to line and grade and maintained in a true position during the depositing of concrete.

3.03 Form Walls

A. Walls shall be spaced close enough to hold forms securely to the designated lines and scabbed at least four-feet (4') on each side of joints to provide continuity.
B. A row of walls shall be placed near the bottom of each placement.
C. Adequate clean-out openings shall be proved for narrow walls and other locations where access to the bottom of the forms is not readily attainable.
D. Facing material shall be placed with parallel and square joints and securely fastened to supporting studs.
E. Forms for surfaces receiving only an ordinary finish and exposed to view shall be placed with the form panels symmetrical, i.e., long dimensions set in the same direction.
F. Forms for round columns exposed to view shall be of steel, except that other materials will be allowed with written permission of the Owner.
G. Horizontal joints shall be continuous.
H. All forms shall be constructed to permit their removal without marring or damaging the concrete.
    1. The forms may be given a slight draft to permit ease of removal.
I. Offset at form joints shall not exceed one-sixteenth inch (1/16").
J. Forms shall conform to the specified radius when placed on curves.
K. All forms and footing areas shall be cleaned of any extraneous matter before placing concrete.
L. Permission to place concrete will not be given until all such formwork is completed to the satisfaction of the Owner.
M. If, at any stage of the work, the forms show signs of bulging or sagging, the portion of the concrete causing such condition shall be removed immediately, if necessary, and the forms shall be reset and securely braced against further movement.

3.04 Spreaders

A. Metal and wooden spreaders which are separate from the forms shall be removed entirely as the concrete is being placed.

3.05 Metal Appliances

A. All metal appliances used inside of forms for alignment purposes shall be removed to a depth of at least one-half inch (1/2") from the concrete surface.
B. They shall be made so the metal may be removed without undue chipping or spalling, and when removed, shall leave a smooth opening in the concrete surface.
C. Burning off of rods, bolts or ties will not be permitted.
D. Any wire ties used shall be cut back at least one-half inch (1/2") from the face of the concrete.

3.06 Railing and Ornamental Work

A. Forms for railing and ornamental work shall be constructed to standards equivalent to first-class millwork.
B. All moldings, panel work and bevel strips shall be straight and true with nearly mitered joints designed so the finished work is true, sharp and clean cut.

3.07 Form Removal Coating

A. Prior to placing concrete reinforcement, the facing of all forms shall be treated with oil or other bond breaking coating of such composition that it will not discolor or otherwise injuriously affect the concrete surface.

3.08 Removal of Forms

A. Except as herein provided, forms for vertical surfaces may be removed when the concrete has aged not less than one (1) day when Type I and Type II cement is used, and not less

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than one-half (1/2) day when Type III cement is used, provided it can be done without damage to the concrete.

B. Forms for inside curb faces may be removed in approximately three (3) hours provided it can be done without damage to the curb.
C. Weight-supporting forms shall be removed once the concrete has attained a compressive strength of 2,500 psi or as directed by the Owner.

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SECTION 032000 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections apply to work of this section.

1.2 DESCRIPTION OF WORK

The work of this section includes labor, materials, hardware, equipment, transportation and services required to fabricate and place all reinforcement for cast-in-place concrete including bars, welded wire fabric, ties and supports shown on the drawings and as specified.

1.3 QUALITY ASSURANCE

A. Codes and Standards:

Comply with all provisions of the following codes, specifications and standards except where more stringent requirements are shown or specified:

1. ACI 315, "ACI Manual of Standard Practice for Detailing Reinforced Concrete Structures".

2. ACI 318, "Building Code Requirements for Reinforced Concrete."

3. Concrete Reinforcing Steel Institute, "Reinforced Concrete, Manual of Standard Practice".

4. Concrete Reinforcing Steel Institute, "Placing Reinforcing Bars."

1.4 SHOP DRAWINGS

A. Shop drawings and samples for all reinforcing steel and related accessories shall be submitted for the Engineer's approval.

B. Shop Drawings shall show layout, bending and assembly diagrams, bar schedules, stirrup spacing, splicing and laps of bars and shall be prepared in accordance with ACI 315.

1.5 TESTING AND INSPECTION

Perform all tests and inspections specified in Laboratory Testing Section of these specifications.

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PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcement:

1. Reinforcing Steel:
All reinforcing steel shall conform to the " Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement," ASTM A615 Grade 60 unless noted otherwise on the drawings. All reinforcing steel required to be welded shall conform to ASTM A 706 "Standard Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement".

2. Tie Wire:
Tie wire shall be annealed steel tie wire, minimum 16 gauge. Provide only plastic coated or stainless steel tie wire in exposed concrete structures and all architectural concrete.

B. Supports for Reinforcement:

Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations.

1. Slabs-on-Grade:

Use supports with sand plates or horizontal runners.

2.2 SPLICES

A. Splice Type and Lap Lengths:

Required splice type and lap lengths are defined on the drawings. Lap splice lengths for unscheduled bars not shown otherwise on the drawings shall be 40 bar diameters minimum.

PART 3 - EXECUTION

3.1 FABRICATION AND DELIVERY

A. Bending and Forming:

Fabricate bars of indicated sizes and accurately form to shapes and lengths indicated and required, by methods not injurious to materials. Do not heat reinforcement for bending. Bars with kinks or bends not scheduled will be rejected.

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B. Marking and Shipping:

Bundle reinforcement and tag with suitable identification to facilitate sorting and placing. Transport and store at site so as not to damage material. Keep sufficient supply of tested, approved and proper reinforcement at the site to avoid delays. Maintain reinforcing bars free of mud, dirt, grease, or other coating.

3.2 PLACING REINFORCEMENT

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports and as herein specified.

B. Before placing and again before concrete is placed, clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required. Exercise particular care to maintain proper distance and clearance between parallel bars and between bars and forms. Provide metal spreaders and spacers to hold steel in position. Support steel at proper height upon approved chairs.

D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Coordinate with other trades and expedite materials and labor to avoid omissions and delay.

F. Install waterproof membrane or moisture barrier as specified prior to placing steel for concrete slabs-on-grade.

G. Extend reinforcement continuous through construction joints or, if approved on the shop drawings, provide dowels of sufficient length to develop the full tension or compression strength of the bar as applicable.

H. Provide and place additional reinforcing steel at all sleeves and openings in beams, slabs and walls as specified on the drawings. Where reinforcement is interrupted by sleeves or openings not shown on the drawings, consult with Engineer for instructions for placing and splicing of bars. Provide required additional reinforcing steel at no additional cost to the Owners.

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3.3 REINFORCING STEEL SPACING AND COVERAGE

A. Reinforcing Steel Coverage

Reinforcing steel coverage should conform to the requirements specified in the General Notes. Cover specified shall be considered minimums that may require increasing where reinforcing steel intersects for different member types. Cover in structural members not specified in the General Notes shall conform to the requirements of ACI 318-08 Section 7.7 unless specified otherwise on the drawings.

B. Reinforcing Steel Spacing:

The clear distance between parallel bars in a layer shall be not less than the bar diameter nor 1". Where parallel reinforcement is placed in 2 or more layers, bars in the upper layer shall be placed directly above bars in the lower layer with clear distance between layers of not less than 1".

3.4 SPLICING REINFORCING STEEL

A. All lap splices in reinforcing steel shall be contact lap splices unless detailed otherwise on the drawings.

B. Maintain proper cover between reinforcing bars at splices.

C. Lap unscheduled reinforcing bars not otherwise specified a minimum of 40 bar diameters at splices. Lap welded wire fabric a minimum of one full wire mesh plus two inches.

3.5 SHRINKAGE AND TEMPERATURE REINFORCEMENT

Provide shrinkage and temperature reinforcement at right angles to main top and bottom bars for all structural slabs unless detailed otherwise on the drawings. See drawings for sizes and spacings.

3.6 MECHANICAL AND PLUMBING REQUIREMENTS

Refer to Mechanical and Plumbing Drawings for formed concrete requiring reinforcing steel. Such reinforcement shall be furnished as part of the work of this section.

3.9 QUALITY CONTROL TESTING DURING CONSTRUCTION

See Testing Laboratory Services section of these specifications for concrete reinforcement inspection and test requirements.

END OF SECTION 03 20 00

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SECTION 03 21 11
REINFORCING STEEL

PART 1 - GENERAL

1.01 Description
A. This specification shall govern work required for the furnishing and placement of Reinforcing Steel as required to complete the project.

1.02 Related Sections
A. 03 31 11 CONCRETE STRUCTURES

1.03 References *The latest edition of the referenced item below shall be used.*
A. **American Concrete Institute (ACI) 318, Building Code Requirements for Structural Concrete**
B. ASTM A36 / A36M – Standard Specification for Carbon Structural Steel
C. ASTM A82 / A82M – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
D. ASTM A123 / A123M – Standard Specification for Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products
E. ASTM A185 / A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
F. ASTM A496 / A496M – Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement
G. ASTM A615 / A615M – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
H. ASTM A675 / A675M – Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties
I. ASTM A706 / A706M – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
J. ASTM A775 / A775M – Standard Specification for Epoxy-Coated Steel Reinforcing Bars
K. ASTM A884 / A884M – Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
L. ASTM A934 / A934M – Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
M. ASTM A996 / A996M – Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
N. ASTM D3963 – Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars
O. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 440, Reinforcing Steel
P. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS-7320, “Qualification Procedure for Reinforcing Steel Mills”
Q. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS-7330, “Qualification Procedure for Reinforcing Steel Epoxy Coating Applicators”
R. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS-4510, “Mechanical Couplers”
S. Concrete Reinforcing Steel Institute (CRSI)
T. American Welding Society AWS D1.4/D1.4M, *"Structural Welding Code - Reinforcing Steel"*

1.04 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related Section(s).
B. Mill approval letter certified by mill.

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PART 2 - PRODUCTS

2.01 General

A. The requirements of the Drawings, Owner, ASTM Designation, and / or ACI requirements shall govern all products.
B. In cases where the provisions of this specification are in conflict with the provisions of the ASTM Designation and / or ACI requirements to which reference is made, the provisions of this specification shall govern.
C. All bars shall be marked in accordance with ASTM A615 or ASTM A706.
D. Furnish copies of a written certification that the reinforcing steel meets the requirements of this Section.

2.02 Approved Mills

A. Reinforcement shall be produced by mills that are approved by the Texas Department of Transportation (TxDOT) in accordance with TxDOT DMS-7320.
B. Mill certification shall be submitted with each delivery prior to incorporation of the material into the Project.

2.03 Deformed Bar

A. Unless otherwise designated on the Drawings, all bar reinforcement shall be deformed.
B. Reinforcing Steel must conform to one of the following:
   1. ASTM A615, Grades 40 or 60,
   2. ASTM A996, Type A, Grades 40 or 60,
   3. ASTM A996, Type R, Grade 60, permitted in concrete pavement only (Furnish ASTM A996, Type R bars as straight bars only and do not bend them. Bend tests are not required),
   4. ASTM A706
   5. ACI 318
C. Large diameter new billet steel (Nos. 14 and 18), Grade 75, and will be permitted for straight bars only.
D. The nominal size and area and the theoretical weight of reinforcing steel bars covered by this specification is shown in Table 1:

Table 1
Size, Area, and Weight of Reinforcing Steel Bars

Bar Size Number	Nominal Diameter (inch)	Nominal Area (square inch)	Weight Per Linear Foot
2	0.250	0.05	0.167
3	0.375	0.11	0.376
4	0.500	0.20	0.668
5	0.625	0.31	1.043
6	0.750	0.44	1.502
7	0.875	0.60	2.044
8	1.000	0.79	2.670
9	1.128	1.00	3.400
10	1.270	1.27	4.303
11	1.410	1.56	5.313
14	1.693	2.25	7.600
18	2.257	4.00	13.60

2.04 Smooth Round Bars and Dowels

A. Reinforcing Steel must conform to one of the following:

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1. ASTM A615, Grades 40 or 60,
2. ASTM A996, Type A, Grades 40 or 60,
3. ASTM A996, Type R, Grade 60, permitted in concrete pavement only (Furnish ASTM A996, Type R bars as straight bars only and do not bend them. Bend tests are not required),
4. ASTM A706
5. ACI 318

B. Large diameter new billet steel (Nos. 14 and 18), Grade 75, and will be permitted for straight bars only.
C. Smooth bars larger than No. 3, provide steel conforming to ASTM A615 or meet the physical requirements of ASTM A36 and ACI 318.
D. Concrete pavement
   1. Smooth bars and Dowels must have a minimum yield strength of 60 ksi and meet ASTM A615 and ACI 318.

2.05 Spiral Reinforcement

A. Spiral reinforcement shall be smooth (not deformed) bars or wire of the minimum diameter shown on the Drawings.
B. Bars
   1. Bars must comply with ASTM A615, Grade 40; ASTM A996, Type A, Grade 40; or ASTM A675, Grade 80, meeting the dimensional tolerances of ASTM A615, and ACI 318.
C. Wire
   1. Wire shall be cold-drawn from rods that have been hot-rolled from billets and shall comply with ASTM A185 and ACI 318.
   2. Smooth wire must comply with ASTM A82.
   3. Deformed wire must comply with ASTM A496.

2.06 Weldable Reinforcing Steel

A. Reinforcement shall comply with ASTM A706 or have a carbon equivalent (C.E.) of at most 0.55%.
B. Furnish copies of the chemical analysis showing the percentages of carbon, manganese, phosphorus and sulfur and written certification that the reinforcing steel meets the requirements of this Section.

2.07 Welded Wire Fabric

A. Provide in rolls or sheets complying with ASTM A185.

2.08 Epoxy Coating

1. Required when and as shown on the Drawings, or as directed by the Owner.
2. The epoxy shall be applied by an approved applicator in accordance with TxDOT DMS-7330, “Qualification Procedure for Reinforcing Steel Epoxy Coating Applicators”.
3. Reinforcement is to be coated in accordance with Table 2.

Table 2
Epoxy Coating Requirements for Reinforcing Steel

Material	Specification
Bar	ASTM A775 or A934
Wire or Fabric	ASTM A884 Class A or B
Mechanical Couplers	As shown on Drawings
Hardware	As shown on Drawings

4. Epoxy coating material and coating repair material shall comply with TxDOT DMS-8130, “Epoxy Powder Coating for Reinforcing Steel”.
5. Epoxy-Coated Reinforcement will be sampled and tested in accordance with TxDOT Tex-739-I.

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6. Maintain identification of all reinforcing throughout the coating and fabrication and until delivery to the project.
7. Furnish copies of a written certification that the reinforcing steel meets the requirements of this Section and copies of the manufacturers control tests.

2.09 Mechanical Couplers

A. When mechanical splices are shown in the Drawings and allowed by the Owner, the following types shall be used:
   1. Sleeve-filler,
   2. Sleeve-threaded,
   3. Sleeve-swaged, or
   4. Sleeve-wedge (not permitted on coated reinforcement).
B. Furnish only couplers that have been produced by a manufacturer that is approved in accordance with TxDOT DMS-4510, “Mechanical Couplers”.
C. Couplers must be sampled and tested in accordance with DMS-4510.
D. Furnish copies of a written certification that the mechanical couplers meets the requirements of this Section.

2.10 Ties

A. Uncoated Reinforcement
   1. Ties shall be a minimum of 16 gauge of like material of the reinforcement
   2. Be in accordance with the Drawings and ACI 318.
B. Coated Reinforcement
   1. Ties shall be a minimum of 16 gauge 7 mil PVC coated
   2. Be in accordance with the Drawings and ACI 318
   3. Be approved by the Owner.

2.11 Spacers and Blocking

A. Galvanized Metal Spacers
   1. Be galvanized in conformance with ASTM A123.
   2. Are to be approved for use by Owner.
   3. Not allowed with epoxy-coated reinforcement.
B. Metal Spacers with Plastic Coated Tips
   1. Are to be approved for use by Owner.
C. Stainless Steel Spacers
   1. Shall be type 316 or as directed by Owner.
   2. Are to be approved for use by Owner.
D. Plastic Spacers
   1. For approval of plastic spacers on project, representative samples of the plastic shall show no visible indications of deterioration after immersion in a five percent (5%) solution of sodium hydroxide for 120 hours.
   2. Must be used with epoxy-coated reinforcement.
E. Pre-cast Mortar or Concrete Blocks
   1. Pre-cast mortar or concrete blocks to be used for holding steel in position adjacent to formed surfaces shall be cast in molds meeting the approval of the Owner and shall be cured by covering with wet burlap or cotton mats for a period of 72 hours.
   2. The blocks shall be cast in the form of a frustum of a cone or pyramid with the smaller face placed against the forms.
   3. A suitable tie wire shall be provided in each block, to be used for anchoring to the steel.
   4. Except in unusual cases, and when specifically otherwise authorized by the Owner, the size of the surface to be placed adjacent to the forms shall not exceed two and one-half inches (2 1/2”) square or the equivalent thereof in cases where circular or rectangular areas are provided.
   5. Blocks shall be cast accurately to the thickness required, and the surface to be placed

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adjacent to the forms shall be a true plane free of surface imperfections.
6. Not allowed with epoxy-coated reinforcement.

PART 3 - EXECUTION

3.01 General

A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.

3.02 Bending

A. The reinforcement shall be bent cold, true to the shapes indicated on the Drawings.
B. Bending shall preferably be done in the shop.
   1. Field bending and method of, will need to be approved by the Owner.
C. Irregularities in bending shall be cause for rejection at no cost to the Owner.
D. Unless otherwise shown on the Drawings, the inside diameter of bar bends, in terms of the nominal bar diameter (d), shall be as shown in Table 3:

Table 3
Minimum Inside Diameter of Bends

Bend	Bar Size Number (inch)	Grade 40	Grade 60	Grade 75
Bends of 90 degree and greater in stirrups, ties and other secondary bars that enclose another bar in the bend.	#3, #4, #5	3d	4d	--
	#6, #7, #8	4d	6d	--
All bends in main bars and in secondary bars not covered above.	#3, #4, #5, #6, #7, #8	5d	6d	--
	#9, #10	5d	8d	--
	#11	5d	8d	8d
	#14, #18	10d	10d	--

E. Where bending of bar sizes No. 14 or No. 18 of Grades 40 and 60 is required, bend testing shall be performed on representative specimens as described for smaller bars in the applicable ASTM Specification.
   1. The required bend shall be 90 degrees around a pin having a diameter of ten (10) times the nominal diameter of the bar.

3.03 Tolerances

A. Fabricating tolerances for bars shall be as specified on the Drawings or as shown in Figure 1:

Figure 1
Fabrication Tolerances for Bars

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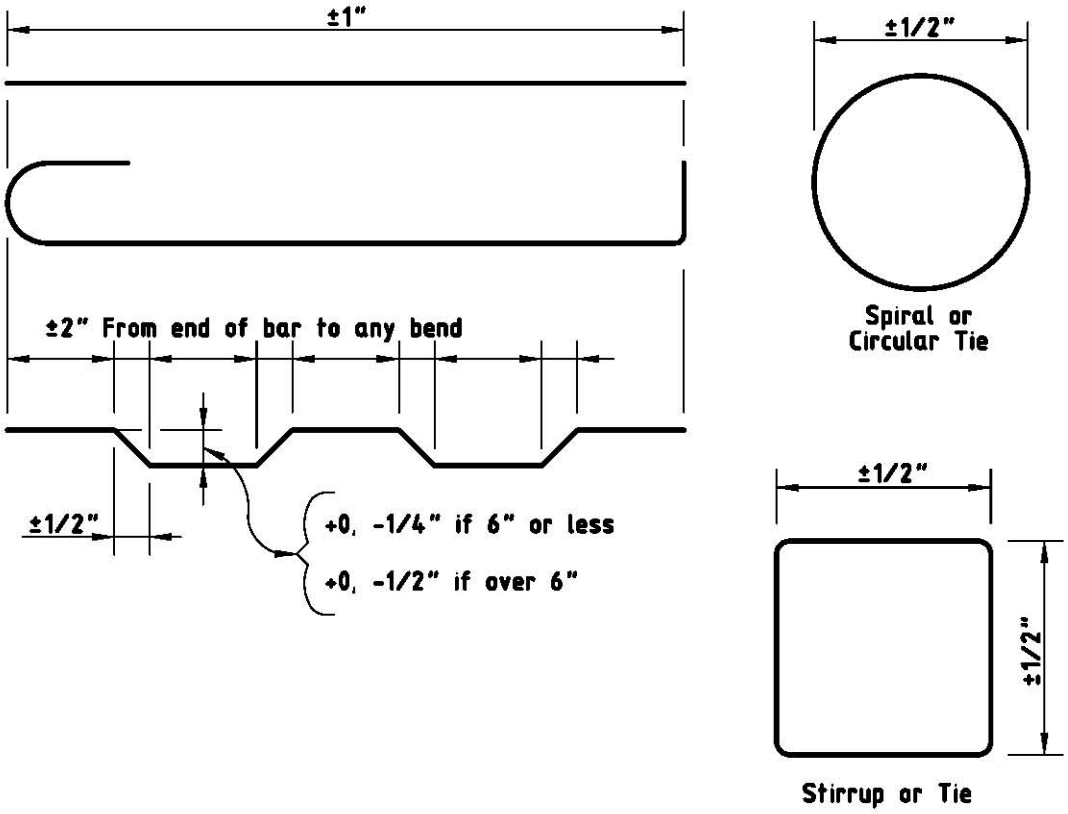

3.04 Storage

A. All materials shall be stored above the surface of the ground upon platforms, skids, or other supports and shall be protected as far as practicable from mechanical injury and surface deterioration caused by exposure to conditions producing rust.
B. Materials shall be free from injurious defects such as cracks and laminations.
C. Rust, surface seams, surface irregularities or mill scale will not be cause for rejection, provided the minimum dimensions, cross-sectional area and tensile properties of a hand wire crushed specimen meets the physical requirements for size and grade of steel specified.

3.05 Splices

A. Bars
   1. No splicing of bars, except when provided on the Drawings or specified herein, will be permitted without written approval of the Owner.
   2. Splices not provided for on the Drawings will be permitted, but not included for measurement, in Grade 40 bars only, sizes No. 8 and smaller, subject to the following:
      a. For bars exceeding forty-feet (40') in drawing length, the distance center to center of splices shall not be less than forty-feet (40') and no individual bar length shall be less than ten-feet (10').
      b. Splices will not be permitted in bars less than forty-feet (40') in drawing length.
      c. Splices which are not shown on the Drawings, but permitted hereby, shall be made in accordance with Table 4, or as directed by Owner:

Table 4

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Minimum Lap Requirements		
Bar Size Number (inches)	Uncoated Lap Length	Coated Lap Length
3	1’-6”	2’-6”
4	2’-0”	3’-0”
5	2’-6”	3’-6”
6	3’-0”	4’-0”
7	3’-6”	5’-6”
8	4’-6”	7’-0”
9	6’-0”	8’-6”
10	7’-6”	11’-0”
11	9’-0”	13’-6”

d. Do not lap No. 14 or No. 18 bars
e. The specified concrete cover shall be maintained at such splices and the bars placed in contact and securely tied together.

3. Splices will not be permitted in main reinforcement at points of maximum stress.
   a. When permitted in main bars, splices in adjacent bars will be staggered a minimum of two (2) splice lengths.

B. Welded Wire
1. Lap length shall be at least two (2) cross wires plus two inches (2”) on each sheet or roll.
2. All intersections of wire shall be securely tied together.

C. Box Culvert Extensions
1. For box culvert extensions with less than one-foot (1’) of fill, the existing longitudinal bars shall have a twenty (20) diameter lap with the new bars.
2. For extensions with more than one-foot (1’) of fill, a minimum of one-foot (1’) lap will be required.

D. Welding
1. Welding of reinforcing bars may be used only where shown on the Drawings and by a method approved by the Owner.
2. All welding operations, processes, equipment, materials, workmanship, and inspection shall conform to the requirements of the Drawings and AWS D1.4/D1.4M, *"Structural Welding Code - Reinforcing Steel"* of the American Welding Society.
3. All splices shall be of such dimension and character as to develop the full strength of bar being spliced.
4. End preparation for butt welding reinforcing bars, shall be done in the field.
5. Delivered bars shall be of sufficient length to permit this practice.
6. Welding of coated bars is not allowed unless the Owner approves of the method and location.

E. Mechanical Couplings
1. Install mechanical coupling in accordance with manufacturer’s recommendations only where shown on the Drawings.
2. Do not repair damaged threads.
3. Mechanical coupling of coated bars is not allowed unless the Owner approves of the method and location.

3.06 Dowel Bars

1. Unless otherwise shown on the Drawings, dowel bars transferring tensile stresses, shall have a minimum embedment equal to the minimum lap requirements shown in Table 4.
2. Shear transfer dowels shall have a minimum embedment of twelve-inches (12”).

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3. Bars shall be greased or sleeved on one (1) end.

3.07 Uncoated Reinforcement Placement

1. Handling
   a. Provide systems for handling the reinforcement to prevent damage.
   b. Bundles shall be lifted with a strong back, spreader bar, multiple supports, platform bridge, or other means to prevent damage.
   c. Do not drag or drop reinforcement.
   d. Do not drag or drop other materials onto reinforcement.
2. Cutting
   a. Cutting of rods, bolt, and ties shall be done by saw or shear-cut only.
   b. Burning off of rods, bolts or ties will not be permitted.
3. Reinforcement
   a. Reinforcement shall be placed as near as possible in the position shown on the Drawings.
      1) Unless otherwise shown on the Drawings, dimensions shown for reinforcement are to the centers of the bars.
      2) In the plane of the steel parallel to the nearest surface of concrete, bars shall not vary from Drawing placement by more than one-twelfth (1/12) of the spacing between bars.
      3) In the plane of the steel perpendicular to the nearest surface of concrete, bars shall not vary from Drawing placement by more than one-quarter inch (1/4”).
      4) Cover of concrete to the nearest surface of steel shall meet the above requirements but shall never be less than one inch (1”) or as shown on the Drawings or as directed by the Owner.
   b. Vertical stirrups shall always pass around the main tensions members and be attached securely thereto.
   c. When placed in the work, reinforcement shall be free from dirt, paint, grease, oil, or other foreign materials.
4. Support
   a. Reinforcement is to be supported and tied in such manner that a sufficiently rigid case of steel is provided.
   b. If the cage is not adequately supported to resist settlement or floating upward of the steel, overturning of truss bars, or movement in any direction during concrete placement, permission to continue concrete placement will be withheld until corrective measures are taken.
   c. Sufficient measurements shall be made during concrete placement to insure compliance with this specification and the Drawings.
   d. All metal appliances used inside of forms for alignment purposes shall be removed to a depth of at least one-half inch (1/2”) from the concrete surface.
      1) They shall be made so the metal may be removed without undue chipping or spalling, and when removed, shall leave a smooth opening in the concrete surface.
5. Tying
   a. All reinforcing steel shall be tied at all intersections, except that where spacing is less than one foot (1’) in each direction, alternate intersections only, need be tied.
   b. Any wire ties used shall be cut back at least one-half inch (1/2”) from the face of the concrete.
6. Spacers and Blocking
   a. The reinforcing steel shall be spaced its required distance from the form surface by means of approved galvanized metal spacers, metal spacers with plastic coated tips, stainless steel spacers, plastic spacers, or approved pre-cast mortar or concrete

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blocks.

b. Metal supports are not allowed to come into contact with the soil, subgrade, water, or other material which is corrosive to metal, unless approved by the Owner.

3.08 Coated Reinforcement Placement

1. Handling
   a. Provide systems for handling the reinforcement with padded contact areas to prevent damage to the coating.
   b. Bundles shall be lifted with a strong back, spreader bar, multiple supports, platform bridge, or other means to prevent damage to the coating.
   c. Do not drag or drop reinforcement.
   d. Do not drag or drop other materials onto reinforcement.
2. Cutting
   a. Cutting of rods, bolt, and ties shall be done by saw or shear-cut only when approved.
      1) The cut shall be coated in accordance with ASTM D3963 and as recommended by the manufacturer.
3. Reinforcement
   a. Reinforcement shall be placed as near as possible in the position shown on the Drawings.
      1) Unless otherwise shown on the Drawings, dimensions shown for reinforcement are to the centers of the bars.
      2) In the plane of the steel parallel to the nearest surface of concrete, bars shall not vary from Drawing placement by more than one-twelfth (1/12) of the spacing between bars.
      3) In the plane of the steel perpendicular to the nearest surface of concrete, bars shall not vary from Drawing placement by more than one-quarter inch (1/4”).
      4) Cover of concrete to the nearest surface of steel shall meet the above requirements but shall never be less than one-inch (1”) or as shown on the Drawings or as directed by the Owner.
   b. Vertical stirrups shall always pass around the main tensions members and be attached securely thereto.
   c. When placed in the work, reinforcement shall be free from dirt, paint, grease, oil, or other foreign materials.
4. Support
   a. Reinforcement is to be supported and tied in such a manner that a sufficiently rigid case of steel is provided.
   b. If the cage is not adequately supported to resist settlement or floating upward of the steel, overturning of truss bars, or movement in any direction during concrete placement, permission to continue concrete placement will be withheld until corrective measures are taken.
   c. Sufficient measurements shall be made during concrete placement to insure compliance with this specification and the Drawings.
   d. All metal appliances used inside of forms for alignment purposes shall be removed to a depth of at least one-half inch (1/2”) from the concrete surface.
      1) They shall be made so the metal may be removed without undue chipping or spalling, and when removed, shall leave a smooth opening in the concrete surface.
5. Tying
   a. All reinforcing steel shall be tied at all intersections, except that where spacing is less than one-foot (1’) in each direction, alternate intersections only, need be tied.
   b. Any wire ties used shall be cut back at least one-half inch (1/2”) from the face of the concrete.

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6. Spacers and Blocking
   a. The reinforcing steel shall be spaced its required distance from the form surface by means of approved metal spacers with plastic coated tips, stainless steel spacers, or approved plastic spacers.
   b. Metal supports are not allowed to come into contact with the soil, subgrade, water, or other material which is corrosive to metal, unless approved by the Owner.
7. Coating Repair
   a. The coating repair shall be in accordance with ASTM D3963 and as recommended by the manufacturer.

3.09 Concrete Placement

1. No concrete shall be deposited until the Owner has inspected the placement of the reinforcing steel and given permission to proceed.
2. Before any concrete is placed, all debris shall be cleaned from the reinforcement.

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SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of concrete work is shown on drawings, including schedules, notes and details which show size and location of members and type of concrete to be poured. Furnish all labor, materials, services, equipment and hardware required in conjunction with or related to the forming, delivery and pouring of all poured-in-place concrete work.

B. Architectural Concrete is specified in other Division-3 sections.

1.3 QUALITY ASSURANCE

The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.

A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

1. ACI 301 - "Specifications for Structural Concrete for Buildings".
2. ACI 302 - "Guide for Concrete Floor and Slab Construction".
3. ACI 304 - "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
4. ACI 305 - "Recommended Practice for Hot Weather Concreting".
5. ACI 306 - "Recommended Practice for Cold Weather Concreting".
6. ACI 318 - "Building Code Requirements for Reinforced Concrete".

B. Document Precedence: In case of conflict among documents, including architectural and structural drawings and specifications, notify the Architect prior to submitting proposal. In case of conflict between the structural drawings and specifications, the strictest interpretation shall govern.

C. Materials and installed work may require testing and retesting, as directed by the Architect/Engineer, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests, not specifically indicated to be done at the Owner's expense, including retesting of rejected materials and installed work, shall be done at the Contractor's expense. See Testing Laboratory section of the Specifications.

Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

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1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including admixtures, patching compounds, epoxies, grouts, waterstops, joint systems, curing compounds, dry-shake finish materials, hardeners, sealers and others as requested by Architect/Engineer.

B. Samples: Submit samples of materials specified if requested by Architect/ Engineer, including names, sources and descriptions.

C. Laboratory Test Reports and Mix Designs: Submit laboratory test reports for concrete materials and mix designs as specified in the Testing Laboratory section of the Specifications.

D. Material and Mill Certificates: Provide material and mill certificates as specified herein and in the Testing Laboratory section of the Specifications. Material and mill certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

E. Construction Joints: There shall be no construction joints for slab on grade, structural floors or columns where they are not indicated on the drawings.

1.5 PROVISION FOR OTHER WORK

Provide for installation of inserts, hangers, metal ties, anchors, bolts, angle guards, dowels, thimbles, slots, nailing strips, blocking, grounds and other fastening devices required for attachment of work. Properly locate in cooperation with other trades and secure in position before concrete is poured. Do not install sleeves in any concrete slabs, beams or columns except where shown on the drawings or upon written approval of the Architect/Engineer.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

Refer to the drawings for classes and strengths of concrete required.

A. Portland Cement:
ANSI/ASTM C 150, Type I or Type III, unless otherwise approved by the Architect/Engineer.

Use one brand of cement, for each class of concrete, throughout the project, unless approved otherwise by the Architect/Engineer and the Testing Laboratory.

B. Normal Weight Aggregates: ANSI/ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

C. Water: Clean, fresh, drinkable, free of oils, acids or organic matter.

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D. Air-Entraining Admixture: ANSI/ASTM C 260. Provide air entrainment in all concrete used for vehicular traffic and parking or concrete permanently exposed to the weather as specified in Table 4.5.1 of ACI 318. Submit manufacturer's certification that product conforms to the requirements specified.

E. Water-Reducing Admixture: ANSI/ASTM C 494, Type A. See maximum permissible chloride ion content in concrete specified below. Submit manufacturer's certification that product conforms to the requirements specified.

F. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G. See maximum permissible chloride ion content in concrete specified below. Submit manufacturer's certification that product conforms to the requirements specified.

G. Water-Reducing, Accelerator Admixture (Non-Corrosive, Non-Chloride): ASTM C 494, Type C or E. See maximum permissible chloride ion content in concrete specified below. Submit manufacturer's certification that product conforms to the requirements specified.

H. Water-Reducing, Retarding Admixture: ASTM C 494, Type D. See maximum permissible chloride ion content in concrete specified below. Submit manufacturer's certification that product conforms to the requirements specified.

I. Specification for Pozzolan Admixtures: Fly ash or other pozzolans used as admixtures may be used provided they conform to "Specification for Fly Ash and/or Calcined Natural Pozzolans for Use in Portland Cement Concrete", ASTM C 618 Class C or F. Fly ash replacement of cement shall not exceed 20% (one part fly ash max. to four parts cement) by weight. Fly ash may not be used in architecturally exposed concrete. Submit manufacturer's certification that product conforms to the requirements specified.

J. Admixtures containing Chloride Ions: Admixtures containing chloride ions shall not be used in concrete containing galvanized or aluminum embedments, concrete containing high early strength cement (Type III), or concrete exposed to sulfate containing solutions such as soils with a water soluble sulfate content more than 0.20 percent by weight and all water with a sulfate content more than 1500 parts per million. Admixtures containing more than 0.05% chloride ions shall not be permitted. The maximum chloride ion content in concrete for corrosion protection shall be as follows:

Type of Member of Cement	Max. Water Soluble Chloride Ion in Concrete at 28 Days, % by weight
Reinforced Concrete and other structures, which may be exposed to chloride in service	0.15
Reinforced Concrete in buildings and other structures that will	

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be dry or protected from moisture in service	1.00
All other reinforced concrete construction	0.30

The Contractor shall have the Concrete Supplier verify in a written submittal to the Architect/Engineer and Testing Laboratory that the chloride ion content in all concrete mix designs used on the project will not exceed limits stated above.

K. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted.

L. Certification: Written conformance to the above mentioned requirements and the chloride ion content of the admixture will be required from the admixture manufacturer prior to mix design review by the Engineer.

2.2 RELATED MATERIALS

A. Waterstops: Provide waterstops at all construction joints and other joints in all foundation walls below grade and where shown on the drawings. Size to suit joints.

1. Rubber waterstops: Corps of Engineers CRD-C 513.

2. Polyvinyl chloride (PVC) waterstops: Corps of Engineers CRD-C 572.

3. Preformed Plastic Waterstops: Federal Specifications SS-S-210A "Sealing Compound for Expansion Joints".

B. Moisture Barrier: Provide moisture barrier cover over prepared base material where indicated. Use only materials, which are resistant to decay when tested in accordance with ANSI/ASTM E 154.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

D. Moisture-Retaining Cover: Complying with ANSI/ASTM C 171:

E. Non-slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rust-proof and non-glazing, and is unaffected by freezing, moisture and cleaning materials.

F. Colored Wear-Resistant Finish: Packaged, dry, combination of materials, consisting of portland cement, graded quartz aggregate, coloring pigments (if required) and plasticizing admixtures. Use coloring pigments that are finely ground, non-fading mineral oxides, interground with cement. Color, as selected

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by Architect, unless otherwise indicated. Submit manufacturer's certification that product conforms to the requirements specified.

G. Liquid Membrane-Forming Curing Compound:
Liquid type membrane forming curing compound complying with ANSI/ASTM C 309, Type I, Class A unless otherwise acceptable to the Architect/Engineer.
Submit manufacturer's certification that product conforms to the requirements specified.

H. Chemical Curing/Floor Hardener Compound: A clear liquid chemically acting compound of sodium silicate that performs as a curing agent with a penetrating compound that changes the free lime in the concrete to calcium silicate, resulting in a surface having a maximum abrasion coefficient of 0.25 cm^3/cm^2 when tested in accordance with ASTM C 118. Submit manufacturer's certification that product conforms to the requirements specified.

I. Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than 2 lb. of fluosilicates per gal. Submit manufacturer's certification that product conforms to the requirements specified.

J. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type for use in cosmetic nonstructural repairs.

K. Epoxy Products: Two component material suitable for use on dry or damp surface, complying with ASTM C 881, for use in all structural concrete repairs.

L. Self-Leveling Mortars for Slab Fill Repair:

M. Expansion Bolts in Concrete:

1. ICBO Approval: Only concrete anchors approved by the International Conference of Building Officials (ICBO) with a published Research Report shall be approved for use.

2. Type: All expansion bolts in concrete shall be only wedge type expansion bolts.

3. Interior Use: All expansion bolts, nuts and washers for use in interior conditioned environments free of potential moisture shall be manufactured from carbon steel zinc plated in accordance with Federal Specification QQ-Z-325C, Type II, Class 3.

4. Exterior or Exposed Use: All expansion bolts, nuts and washers for use in exposed or potentially wet environments, or for attachment of exterior cladding materials shall be galvanized or stainless steel. Galvanized bolts, nuts and washers shall conform to ASTM A 153. Stainless steel bolts shall be manufactured from 300 series stainless steel and nuts and washers from 300 series or Type 18-8 stainless steel.

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5. Nuts and Washers: Nuts and washers shall be furnished from the manufacturer and used with the bolts.

2.3 PROPORTIONING AND DESIGN OF MIXES

A. Refer to Testing Laboratory section of the Specifications.

2.4 CONCRETE MIXES

A. Ready-Mix Concrete:
Comply with requirements of ANSI/ASTM C 94, "Ready Mixed Concrete" and Testing Laboratory section of the specifications.

PART 3 - EXECUTION

3.1 JOINTS IN CONCRETE

A. Construction Joints: Locate and install construction joints as indicated on the drawings or if not shown on drawings, located so as not to impair strength and appearance of the structure, as acceptable to Architect/Engineer.

1. Place construction joints in the center one third of spans unless specified otherwise. Continue reinforcement across construction joints. Submit construction joint locations not shown on the drawings for Engineer's approval.

2. Waterstops: Provide waterstops in construction joints as indicated on the Architectural and Structural Drawings. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.3 PREPARATION OF FORM SURFACES

A. Clean reused forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

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B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

C. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.4 CONCRETE PLACEMENT

A. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

C. Comply with ACI 304, Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete, and as herein specified.

1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

2. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
3. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309 recommended practices.

4. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

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5. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

6. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

7. Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedges, bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

8. Maintain reinforcing in proper position during concrete placement operations.

3.5 FINISH OF FORMED SURFACES

A. Rough Form Finish: Provide rough form finish for formed concrete surfaces not exposed-to-view in the finish work unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish: Provide smooth form finish for formed concrete surfaces exposed-to-view or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces, which have received smooth form finish treatment.

1. Combine one part portland cement to 1-1/2 parts fine sand by volume, and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard portland cement and white portland cement, amounts determined by trial patches, so that final color of dry grout will closely match adjacent surfaces.

2. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.

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E. Related Unformed Surfaces: At tops of walls, horizontal offsets surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.6 MONOLITHIC SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo and other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to tolerance specified below. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance as specified below. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or other thinfilm finish coating system. After floating, begin first trowel finish operation using power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a level surface to a tolerance as specified below. Grind smooth surface defects, which would telegraph through applied floor covering system.

D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified above, then immediately follow with slightly scarifying surface by fine brooming.

E. Non-Slip Broom Finish: Apply non-slip broom finish to ramps less than 6% exterior concrete platforms, steps and elsewhere as indicated. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

F. Rake Finish: Provide a rake finish to all ramps exceeding a 6% slope. Finish shall be applied perpendicular to direction of traffic.

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G. Chemical-Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water (parts of hardener/water as follows), and apply in 3 coats; first coat, 1/3-strength; second coat, 1/2-strength; third coat, 2/3-strength. Evenly apply each coat and allow 24 hours for drying between coats.

Apply proprietary chemical hardeners, in accordance with manufacturer's printed instructions. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

H. Non-slip Aggregate Finish: Apply non-slip aggregate finish to concrete stair treads, platforms, ramps and elsewhere as indicated on the Architect's or Structural Drawings.

After completion of float finishing, and before starting trowel finish, uniformly spread 25 lb. of dampened non-slip aggregate per 100 sq. ft. of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as herein specified.
After curing, lightly work surface with a steel wire brush, or an abrasive stone, and water to expose non-slip aggregate.

I. Colored Wear-Resistant Finish: Provide colored wear-resistant finish to monolithic slab surface indicated.

Apply dry shake materials for colored wear-resistant finish at rate of not less than 60 lbs. per 100 sq. ft., unless greater amount is recommended by material manufacturer.

Immediately following first floating operation, uniformly distribute approximately 2/3 of required weight of dry shake material over concrete surface, and embed by means of power floating. Follow floating operation with second shake application, uniformly distributing remainder of dry shake material at right angles to first application, and embed by power floating.

After completion of broadcasting and floating, apply trowel finish as herein specified. Cure slab surface with curing compound recommended by dry shake hardener manufacturer, waiting up to time period as required by the manufacturer (depending on humidity and drying) before application. Do not use moisture-cover or moisture curing methods.

3.7 CONCRETE FINISH MEASUREMENT AND TOLERANCES

A. Definitions:

1. Flatness - A measure of a concrete surfaces curvature or deviation from a planar surface. Concrete surfaces that are not flat are wavy or bumpy.

2. Levelness - A measure of a concrete surfaces tilt or inclination from a horizontal plane. Concrete surfaces that are not level are sloped or tilted.

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B. Construction Requirements to Achieve Specified Floor Finish Tolerances:

1. Forms shall be properly leveled, in good condition and securely anchored including special attention to ends and transitions.
2. Bearing surfaces for straightedges such as form edges or previously poured slabs shall be kept clean of laitance, sand, gravel, or other foreign elements.
3. Screeds shall be maintained in good condition with true round rolling wheels and level cutting edges. The use of optical sighting equipment such as lasers is recommended for checking levelness and straightness. The Contractor shall promptly adjust or replace equipment when test results indicate substandard work.

C. Concrete Floor Finish Tolerance for Slab-on-Grade Construction:

1. Concrete Placement: Concrete shall be placed and screeded to predetermined marks set to elevations prescribed on the drawings.

2. Tolerance: Finished floor elevation shall not vary more than ¼ inch in 10 feet, non cumulative.

D. Remedial Measures for Slab Finish Construction Not Meeting Specified Tolerances:

1. Modification of Existing Surface:

a. If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work can be repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately undertake the approved repair method.

b. The Contractor shall submit for review and approval a detailed work plan of the proposed repair showing areas to be repaired, method of repair and time to effect the repair.

c. Repair method(s), at the sole discretion of the Architect/Engineer or Owner's Representative, may include grinding (floor stoning), planing, retopping with self leveling grout or polymer concrete, or any combination of the above.

d. The Architect/Engineer or Owner's Representative maintains the right to require a test repair section using the approved method of repair for review and approval to demonstrate a satisfactory end product. If, in the opinion of the Architect/Engineer or Owner's Representative, the repair is not satisfactory an alternate method of repair shall be submitted or the defective area shall be replaced.

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e. The judgment of the Architect/Engineer or Owner's Representative on the appropriateness of a repair method and its ability to achieve the desired end product shall be final.

f. All repair work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

2. Removal and Replacement:

a. If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work cannot be satisfactorily repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately commence to remove and replace the defective work.

b. Replacement section boundaries shall be made to coincide with the test section boundaries as previously defined.

c. Sections requiring replacement shall be removed by sawcutting along the section boundary lines to provide a neat clean joint between new replacement floor and existing floor.

d. The new section shall be reinforced the same as the removed section and doweled into the existing floor as required by the Engineer. No existing removed reinforcing steel may be used. All reinforcing steel shall be new steel.

e. Replacement sections may be retested for compliance at the discretion of the Architect/Engineer or Owner's Representative.

f. The judgment of the Architect/Engineer or Owner's Representative on the need for replacement shall be final.

g. All replacement work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

3.8 CONCRETE CURING AND PROTECTION

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Maintain concrete with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of concrete.

2. Curing shall commence as soon as free water has disappeared from the concrete surface after placing and finishing. The curing period shall be 7 days for all concrete except high early strength concrete, which shall be cured for 3 days minimum, unless test cylinders, made and kept adjacent to the structure and cured by the same methods, are tested with the

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average compressive strength equal to 70% of the specified 28 day strength. Curing may also be terminated when the temperature of the concrete is maintained at least 50°F for the same length of time that laboratory cured cylinders, representative of the concrete in place, require to achieve 85% of the 28 day compressive strength.

3. Curing shall be in accordance with ACI 301 procedures. Avoid rapid drying at the end of the curing period.

B. Curing Methods: Perform curing of all concrete horizontal and vertical surfaces (including columns, shear walls and basement walls) by one of the methods specified or by combinations thereof, as herein specified. The Contractor shall choose a curing method that is compatible with the requirements for subsequent material usage on the concrete surface. Parking garages shall be cured using only methods 1 or 2 below.

1. Provide moisture curing by one of the following methods:

a. Keep concrete surface continuously wet by covering with water.

b. Continuous water-fog spray.

c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

2. Provide moisture-cover curing as follows: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Provide curing/hardener or liquid membrane forming curing compound to interior slabs with resilient flooring, carpet over cushion, or left exposed; and to exterior slabs, walks and curbs, as follows:

Apply specified compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Do not allow to puddle. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue down carpet), painting and other coatings and finish materials, unless otherwise acceptable to the Architect.

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Use only clear curing compounds for exposed interior slabs and all exterior concrete.

C. Curing Formed Surfaces: Where wooden forms are used, cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. When forms are removed, continue curing by methods specified above, as applicable.

D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping and other flat surfaces by application of appropriate curing compound.

Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

3.9 HOT WEATHER CONCRETING

A. Definition:

1. Conditions warranting hot weather concreting practices are defined as any combination of high air temperature, low relative humidity and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise result in abnormal properties.
2. The maximum acceptable concrete temperature at the truck discharge point shall be 95°F.

B. Specification: Hot weather concreting practices required to limit the concrete temperature at the truck discharge point to 95°F or lower shall be followed according to ACI 305 "Hot Weather Concreting."

C. Records: Under hot weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature at truck discharge and general weather conditions.

D. Hot Weather Concreting Requirements: The following items, all or in part as required, should be followed to limit the concrete temperature to 95°F or lower:

1. Design the concrete mixes specifically for hot weather conditions replacing some cement with fly ash or other pozzolan and using a water reducing retarding admixture (ASTM C 494 Type D).
2. Use the largest size and amount of coarse aggregate compatible with the job.
3. Use sunshades and/or windbreaks.
4. Delay construction of indoor slabs-on-grade until the walls and roof are constructed.
5. Cool and shade aggregate stockpiles.
6. Use ice as part of the mixing water or cool the water with liquid nitrogen.
7. Limit the number of revolutions at mixing speed to 125 maximum.
8. Paint mixers and storage bins or silos white to minimize heat absorption.
9. Reduce time between mixing and placing as much as possible.

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10. Do not add water to ready-mixed concrete at the job site unless it is part of the amount required initially for the specified water-cement ratio and the specified slump.
11. Schedule concrete placement for early morning, late afternoon, or night.
12. Have all forms, equipment and workers ready to receive and handle concrete.
13. Maintain one standby vibrator for every three vibrators used.
14. Keep all equipment cool by spraying with water including chutes, conveyors, pump lines, tremies, reinforcement and buggies.
15. Dampen the subgrade and side forms with cool water.
16. Protect slab concrete at all stages against undue evaporation by applying a fog spray or mist above the surface or applying a monomolecular film. Where high temperatures and/or placing conditions dictate, use water-reducing retarding admixture (Type D) in lieu of the water-reducing admixture (Type A) as directed by the Owner's Testing Laboratory.
17. Provide continuous curing, preferably with water, during the first 24 hours using wet burlap, cotton mats, continuous spray mist, or by applying a curing compound meeting ASTM C 309. Continue curing for 3 days minimum.
18. Spray exteriors of forms to keep them cool.
19. As soon as possible, loosen forms and run water down the inside. When forms are removed, provide a wet cover to newly exposed surfaces.

3.10 COLD WEATHER CONCRETING

A. Definition:

1. Concrete shall not be placed on any day when the outside air temperature is 40°F or less and falling unless cold weather concreting practices are followed as specified below.

2. Cold weather concreting practices should be followed whenever the mean daily temperature drops below 40°F for more than three successive days.

3. The temperature of concrete mixed and delivered to the job site shall conform to the following requirements:

Air Temperature	Min. Concrete Temperature
Above 30°F	60°F
0°F to 30°F	65°F
Below 0°F	70°F

4. The minimum temperature of concrete during placement and curing shall be 55°F. The maximum concrete temperature heated by artificial means at point of placement shall not exceed 90°F.

B. Specification: Cold weather concreting practices required to limit the concrete temperatures as specified above shall be followed according to ACI 306R-78 "Cold Weather Concreting".

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C. Records: Under cold weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature as placed and general weather conditions.

D. Cold Weather Concreting Requirements: The following items, all or in part as required, should be followed to assure acceptable concrete in cold weather conditions:

1. Design the concrete mix suitable for cold weather. Use air entrainment and obtain high early strength by using a higher cement content, a high early strength cement (Type III), or an accelerator (ASTM C 494 Type C and E).
2. Protect the concrete during curing period using insulating blankets, insulated forms, enclosures and/or heaters.
3. Concrete cured in heated enclosures shall have heaters vented to prevent exposure of concrete and workmen to noxious gases.
4. Frozen subgrade shall be thawed prior to concrete placement and snow and ice shall be removed from forms.
5. Concrete shall be protected and cured at 55°F for three days minimum if normal concrete (Type I cement) is used and for two days minimum if high early strength concrete (concrete with Type III cement, 100 pounds cement added per cubic yard concrete, or an accelerator added).
6. Concrete not loaded during construction shall be protected a minimum of 3 days for normal concrete and 2 days for high early strength concrete to obtain safe form stripping strength. Concrete fully loaded during construction shall be protected for whatever time period is required to obtain the required strength as determined by nondestructive strength tests (Windsor probe, Swiss Hammer Test) on the in-place concrete.
7. Heat the mixing water and then blend hot and cold water to obtain concrete no more than 10°F above the required temperature.
8. Heat the aggregates by circulating steam in pipes placed in the storage bins for air temperatures consistently below 32°F. When either water or aggregate is heated to over 140°F combine them in the mixer first to obtain a maximum temperature of the mixture not to exceed 140°F in order to prevent flash set of the concrete.
9. Uniformly thaw aggregates far in advance of batching to prevent moisture variations in the stockpile.
10. Cover warmed stockpiles with tarps to retain heat.
11. Place air entraining admixture in the batch after the water temperature has been reduced by mixing with cooler solid materials.
12. Use wind screens to protect concrete from rapid cooling.
13. Place vertical pump lines inside the building, if possible, for concrete being pumped.
14. Maintain artificial heat as low as possible to reduce temperature stresses during cooling.
15. Avoid water curing of concrete. Apply the required curing compound to unformed surfaces as soon as possible to prevent drying of concrete from heated enclosures.

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16. Delay form stripping as long as possible to help prevent drying from heated enclosures and to reduce damage to formed surfaces caused by premature stripping.
17. Provide triple thickness of insulating materials at corners and edges vulnerable to freezing.
18. Wrap protruding reinforcing bars with insulation to avoid heat drain from the warm concrete.
19. Gradually reduce the heat at the end of the heating period to reduce likelihood of thermal shock.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with inplace construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE SURFACE REPAIRS

A. Definition - Defective Areas:

1. Formed Surfaces: Concrete surfaces requiring repairs shall include all honeycombs, rock pockets and voids exceeding 1/4" in any dimension, holes left by tie rods or bolts, cracks in excess of 0.01" and any other defects that affect the durability or structural integrity of the concrete.

2. Unformed Surfaces: Concrete surfaces requiring repair shall include all surface defects such as crazing, cracks in excess of 0.01" wide or cracks which penetrate to reinforcement or through the member, popouts, spalling and honeycombs.

B. Classification:

1. Structural Concrete Repair: Major defective areas in concrete members that are load carrying (such as shear walls, beams, joists and slabs), are highly stressed, and are vital to the structural integrity of the structure shall require structural repairs. Structural concrete repairs shall be made using a two part epoxy bonder and/or epoxy mortar. Location of structural concrete repairs shall be determined by the Engineer.

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2. Cosmetic Concrete Repair: Defective areas in concrete members that are non-load carrying and minor defective areas in load carrying concrete members shall require cosmetic concrete repair. Cosmetic concrete repairs may be made using a non-epoxy non-shrink patching mortar and bonding agent. The location of cosmetic concrete repair required shall be determined by the Engineer. Cosmetic concrete repair in exposed-to-view surfaces will require Architect's approval prior to patching operation.

3. Slab Repairs: High areas in concrete slabs shall be repaired by grinding after concrete has cured at least 14 days. Low areas shall be filled using self-leveling mortars. Repair of slab spalls and other surface defects shall be made using epoxy products as specified above and as determined by the Engineer.

3.13 QUALITY CONTROL TESTING DURING CONSTRUCTION

See Testing Laboratory Services section of these Specifications for concrete materials and cast-in-place concrete inspection and test requirements.

END OF SECTION 03 30 00

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SECTION 03 31 00 - EPOXY RELATED WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of contract, including General and Supplementary Conditions and Division - 1 Specification Sections, apply to the work of this section.

1.2 SCOPE OF WORK

A. Installation of epoxy grouted dowels or reinforcing steel, and bonding fresh concrete to hardened concrete. Such work shall be done by the Contractor in strict conformance to these specifications.

1.3 QUALITY ASSURANCE

A. Applicable Standards

1. American Society for Testing and Materials (ASTM)

C881	Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

2. American Concrete Institute (ACI)

ACI 503 R	Use of Epoxy Compounds with Concrete
ACI 503.1	Standard Specification for Bonding, Hardened Concrete, Steel, Wood, Brick, and Other Materials to Hardened Concrete with a Multi-Component Epoxy Adhesive
ACI 503.2	Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive
ACI 503.3	Standard Specification for Producing a Skid-Resistant Surface on Concrete by the Use of Multi-Component Epoxy System
ACI 503.4	Standard Specification for Repairing Concrete with Epoxy Mortars

B. Manufacturer's Qualifications

Companies furnishing the epoxy materials shall have a proven track record of at least five years. Furthermore, they shall have in existence a program of training, certifying and supporting a nationally organized program of approved contractors. Evidence of this shall be made available to the Engineer/Architect upon request.

C. Contractor's Qualifications: Contractor performing the work shall be an approved contractor by the manufacturer furnishing the epoxy materials, and shall have no less than five years experience in the various types of epoxy related work required in this project. A notarized certification from the manufacturer attesting to the training shall be submitted to the Engineer/Architect along with the proposal to do the work.

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PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR EPOXY MATERIALS:

A. All epoxy material shall be new and manufactured within the shelf life limitations set forth by the manufacturer.

B. Epoxy shall be a two-part epoxy adhesive material, and shall be of epichlorohydrin/amine type. Polysulphide epoxies are not acceptable.

C. Epoxy used shall be insensitive to the presence of water and moisture, and shall be capable of application and of strength development even when applied to damp surfaces having a temperature of 40° or above.

D. Epoxy used shall develop a minimum strength of 6310 psi in tension and 12000 psi in compression at the end of seven days.

E. Epoxies used shall not deteriorate under approximately 200 freeze thaw cycles.

F. Epoxies used shall be 100% solids without solvents.

G. Bonding and strength characteristics of epoxies shall be stable when exposed to ultraviolet rays.

2.2 ADDITIONAL REQUIREMENTS FOR EPOXY MORTARS

A. Epoxy mortar used for bonding, patching, and resurfacing, shall have the following additional properties:

1. Epoxy mortar shall be non-sagging.

2. Sand used in preparing mortar shall be graded oven dry quartzite and furnished in bags.

3. The epoxy mortar patch material shall match the existing texture and color of exposed concrete without giving a blotchy appearance. A test patch shall be applied for approval prior to final acceptance of the mortar. Size of test patch shall be approximately equal to the size of the average mortar patch to be used on the project.

2.3 GENERAL REQUIREMENTS FOR POLYMER MODIFIED CEMENTITIOUS MORTARS:

A. Mortar used for bonding, patching, and resurfacing in exposed or exterior environmental conditions with large cyclic temperature changes shall have the following properties:

1. Mortar shall be non-sagging.

2. Coefficient of thermal expansion shall be comparable with that of concrete (5.5×10^{-6} in/in/°F).

3. Sand used in preparing mortar shall be graded oven dry quartzite furnished in bags.

4. The mortar patch material shall match the existing texture and color of exposed concrete without giving a blotchy appearance. A test patch shall be applied for approval prior to final acceptance of the mortar. Size of test patch shall be approximately equal to the size of the average mortar patch to be used on the project.

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PART 3 - EXECUTION

3.1 EPOXY MORTAR:

A. Applicator's Qualifications

1. Epoxy mortar repair work shall only be performed by contractors who have successfully used this process on at least three similar structural repairs of equal scope which have performed successfully for a minimum period of five years.

2. Only adequately trained and experienced personnel shall be used on the job.

B. Surface Preparation

1. Concrete surface to which the epoxy mortar is to be applied shall be exposed parent concrete free of loose and unsound materials. Surface preparation shall be done by abrasive blasting, waterblasting or as otherwise required by the manufacturer.

2. Necessary approvals shall be obtained by the Contractor from authorizing governmental or other agencies prior to abrasive blasting. Abrasive blasting operations shall comply with the requirements of OSHA and NIOSH (National Institute for Occupational Safety and Health) Standard PB-246-697.

3. Surfaces shall be free of any deleterious materials such as laitance, dust, dirt, and oil.

4. Any exposed reinforcing steel shall also be cleaned and be free of rust and other contaminants. Cleaning shall be accomplished by mechanical means. Use powered wire brushes in locations where reinforcing steel cannot be cleaned by abrasive-blasting or water-blasting. All exposed reinforcing steel shall be coated with a corrosion inhibiting product specified elsewhere in this specification prior to mortar application.

5. Prime the cleaned surface with primer as required by the manufacturer.

C. Concrete Surface Inspection

1. Ensure that the surface temperature is at least 40°F to permit wetting of concrete surface by epoxy coating.

2. The Contractor shall evaluate the moisture content of concrete surface receiving epoxy mortar. This shall be done by determining if moisture will collect at bond lines between concrete and epoxy mortar before epoxy has cured. Evaluate this by taping a piece of polyethylene sheet to the concrete. If moisture collects on underside of the polyethylene sheet before epoxy would cure, then allow concrete to dry sufficiently to prevent the possibility of moisture between old concrete and new epoxy.

D. Mortar Application

1. Condition epoxy compound components to a temperature between 65°-80°F unless otherwise recommended by the manufacturer. Epoxies beyond this range of temperature shall not be used.

2. Stir each of the two parts of epoxy separately before mixing. Then mix in a clean container free of contaminants.

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3. Thoroughly blend epoxy components and sand with Jiffy mixers (made by The Jiffy Mixer Co., Irvine, California) to a uniform and homogenous mixture. Small batches of one quart or less may be mixed by spatulas, palette knives or similar devices.

4. Mixing should be accomplished well within the pot life of epoxy (three minutes when using Jiffy mixer or five minutes when mixed by hand) after allowing for time required for application.

5. Apply mortar by trowel or other means suitable for the consistency of the epoxy-sand mortar mix.

6. Build up the repair area in layers with mortar thicknesses within those specified by the manufacturer (1/4" maximum per layer).

7. Consolidate the mortar thoroughly to remove entrapped air.

8. Finish surface of mortar to match the texture and contours of existing concrete.

9. Allow mortar to cure in accordance to manufacturers recommendations.

E. Cleanup

1. Protect surfaces surrounding the work areas against spillage.

2. Epoxy and epoxy mortar spillages shall be cleaned before they set.

3. Cleanup all portions of the existing structure that are soiled or stained in the process of epoxy mortar repair work.

3.2 EPOXY GROUTED BOLTS, DOWELS OR REINFORCING STEEL:

A. Applicator's Qualifications

1. Epoxy grouting of bolts, dowels or reinforcing steel shall only be performed by contractors who have had successful experience on a minimum of three projects of similar scope.

2. Only adequately trained epoxy applicators shall be used on the job. Furnish current certificate of training on request.

B. Surface Preparation

1. All bolts, dowels and reinforcing bars shall be abrasive blasted no more than eight hours before the grouting. If evidence of oxidation exists on the surface, the bolts, reinforcing bars and dowels shall be recleaned. Blast-clean surfaces using Steel Structures Painting Council, Surface Preparation No. 6, to give a surface condition corresponding to ASa2, BSa2, CSa2 of SSPC Vis 1, depending on the initial surface condition of the steel surface. Prior to blast-cleaning, clean surfaces to conform to SSPC SP1, SP2, and SP3, as required.

2. All holes shall be clean of dust, debris, and contaminants. Use compressed air from an oil-and-water-free compressed air source prior to epoxy application.

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C. Drilling Holes for Embedment

1. Use only rotary-percussion type drills for drilling holes.
2. Drills shall be fitted with bits having single tooth that produce large cuttings, and hollow stem drill rods that permit simultaneous blowing of compressed air providing immediate expulsion of the cuttings from the hole.

3. Do not cut through any reinforcing steel unless indicated otherwise on the drawings. Use small diameter exploratory holes to detect presence of reinforcing steel prior to drilling holes for grouting.

4. Core drilling equipment, and electric impact hammers or other tools which do not provide for immediate expulsion of the drill cuttings shall not be used.

5. Unless noted otherwise on the drawings, depth of hole used for embedding the bolts, bars or dowels shall be at least fifteen times their diameter.

6. Unless noted otherwise on the drawings, the center to center distance between the embedded bolts, bars or dowels shall be at least twelve times their diameter.

7. Unless noted otherwise on the drawings, the edge distance shall be at least six times the diameter of the bolt, bar or dowel.

8. Hole diameter shall normally be 1/4" larger than the outside diameter of the embedded item. In no case shall the hole diameter be 3/8" larger than the diameter of the embedded item.

D. Epoxy Application

1. Condition epoxy compound materials at a temperature between 65°-80°F unless otherwise recommended by the manufacturer. Epoxies beyond this range of temperature shall not be used.

2. Mix epoxy materials in a clean container free of contaminants.

3. Thoroughly blend epoxy components with mechanical mixers to a uniform and homogenous mixture. Mix small batches (up to 1 quart) by use of spatulas, palette knives, or similar devices. Take care to use proper proportions of the epoxy components when using small batches.

4. Mixing shall be accomplished well within the pot life of the epoxy after allowing for time required for application.

5. Partially fill the hole with epoxy. Then insert the bolt, dowel or reinforcing bar into the hole such that the resin material oozes out around the embedded item, ensuring complete contact. Twist the bolt, dowel or bar slightly as it is inserted in the hole to ensure complete contact.

6. As an alternative to inserting the embedded item after the epoxy is poured in the hole, the bolt, dowel, or bar may be positioned in the hole and filled up with epoxy by hand caulking guns or injected with an in-head mixing equipment. In either case, the nozzle shall be provided with a hose or tube of sufficient length to reach the bottom of the hole being filled.

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7. Where the holes are horizontal or overhead, the opening shall be covered by a masking or a duct tape. Make a split in the tape and insert the epoxy injection tube through the split. Fill hole completely with epoxy and then insert the embedded item through the split tape. Amount of epoxy should be such that a small amount of material oozes through the split. Twist the bolt, dowel or bar slightly as it is inserted in the hole to ensure complete contact.
8. Do not apply epoxy in the rain or in the presence of standing water.

E. Cleanup

1. Protect surfaces surrounding the work area against spillage.

2. Epoxy oozed out from the holes and spillages shall be cleaned before they become difficult to remove.

3. Cleanup whatever portions of the existing structure are soiled or stained in the process of grouting the bolts, dowels or reinforcing bars.

END OF SECTION 03 31 00

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SECTION 03 31 11
CONCRETE STRUCTURES

PART 1 - GENERAL

1.01 Description
A. This specification shall govern work required for the construction of structures involving the use of structural concrete as required to complete the project.

1.02 Related Sections
A. 03 11 13.11 CONCRETE FORMS
B. 03 21 11 REINFORCING STEEL
C. 03 35 11 CONCRETE FINISHING
D. 03 39 11 CONCRETE CURING

1.03 References *The latest edition of the referenced item below shall be used.*
A. ACI 211, “Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete”
B. ACI 302, “Recommended Practice for Concrete Floor and Slab Construction”
C. ACI 304, “Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete”
D. ACI 305, “Recommended Practice for Hot Weather Concreting”
E. ACI 306, “Recommended Practice for Cold Weather Concreting”
F. ACI 309, “Consolidation of Concrete”
G. ACI 315, “Recommended Practice for Detailing Reinforced Concrete Systems”
H. ACI 318, “Building Code Requirements for Structural Concrete”
I. ACI 614, “Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete”
J. ASTM C 150 – Specification for Portland Cement
K. ASTM C 595 – Specification for Blended Hydraulic Cements
L. ASTM C 845 – Specification for Expansive Hydraulic Cement
M. ASTM C 1157 – Performance Specification for Hydraulic Cement
N. ASTM D 994 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)
O. ASTM D 1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
P. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 420, Concrete Structures
Q. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 421, Hydraulic Cement Concrete
R. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS–4610, Fly Ash
S. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS–4640, Chemical Admixtures for Concrete
T. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS–6310, Joint Sealants and Fillers
U. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS–6160, Waterstops, Nylon Reinforced Neoprene Sheet, and Elastomeric Pads
V. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS–4650, Hydraulic Cement Concrete Curing Materials and Evaporation Retardants
W. Texas Department of Transportation (TxDOT) Test Procedure Tex-100-E
X. Texas Department of Transportation (TxDOT) Test Procedure Tex-203-F
Y. Texas Department of Transportation (TxDOT) Test Procedure Tex-401-A
Z. Texas Department of Transportation (TxDOT) Test Procedure Tex-410-A
AA. Texas Department of Transportation (TxDOT) Test Procedure Tex-411-A

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BB. Texas Department of Transportation (TxDOT) Test Procedure Tex-413-A
CC. Texas Department of Transportation (TxDOT) Test Procedure Tex-472-A
DD. CRSI, “Reinforced Concrete – A Manual of Standard Practice”
EE. National Ready Mixed Concrete Association (NRMCA)

1.04 Submittals

A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related Section(s).
B. Complete concrete design data shall be submitted to the Owner for approval.
C. All test results shall be sent to the Owner upon completion of test.

1.05 Definitions

A. Retarding admixture - a material which, when added to a concrete mixture in the correct quantity, will retard the initial set of the concrete.
B. Water-reducing admixture – a material which, when added to a concrete mixture in the correct quantity, will reduce the quantity of mixing water required to produce concrete of a given consistency.

PART 2 - PRODUCTS

2.01 General

A. Any testing required for approval of use of a product is the responsibility of the Contractor.

2.02 Hydraulic Cement

A. Cement shall be in conformance with TxDOT DMS-4600.
   1. Any testing required for approval of use is the responsibility of the Contractor.
B. For cement strength requirements, either the tensile or the compressive test may be used.
C. Either Type I or II cement shall be used unless Type II is specified on the Drawings.
   1. Except when Type II is specified on the Drawings, Type III cement may be used when the anticipated air temperature for the succeeding twelve (12) hours will not exceed 60° F.
   2. Type III cement may be used in all precast prestressed concrete, except in piling when Type II cement is required for substructure concrete.
   3. Only one (1) brand of each type will be permitted on the entire project, unless otherwise authorized by the Owner.
D. Cement Delivery
   1. Bulk
      a. Cement may be delivered in bulk where adequate bin storage is provided.
      b. Information shall be provided in the bills of lading accompanying each shipment of name of the manufacturer and the type of cement.
   2. Bag
      a. Shall be delivered in bags marked plainly with the name of the manufacturer and the type of cement.
      b. Information shall be provided in the bills of lading accompanying each shipment of name of the manufacturer and the type of cement.
      c. Bags shall contain ninety-four (94) pounds net.
      d. All bags shall be in good condition at time of delivery.
   3. No caked cement will be accepted.
E. Storage
   1. All cement shall be stored in well-ventilated weatherproof buildings or approved bins, which will protect it from dampness or absorption of moisture.
   2. Storage facilities shall be ample, and each shipment of packaged cement shall be kept separated to provide easy access for identification and inspection.

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3. The Owner may permit small quantities of sacked cement to be stored in the open for a maximum of forty-eight (48) hours on a raised platform and under waterproof covering during periods of no precipitation.
4. Cement remaining in storage for a prolonged period of time may be retested and rejected if it fails to conform to any of the requirements of these specifications.

2.03 Aggregate

A. Supply aggregates that meet the definitions in TxDOT Tex-100-E.

B. Coarse Aggregate

1. Coarse aggregate shall consist of durable particles of gravel, crushed blast furnace slag, crushed stone, or combinations thereof; free from frozen material or injurious amount of salt, alkali, vegetable matter, or other objectionable material either free or as an adherent coating; and its quality shall be reasonably uniform throughout.
2. It shall not contain more than quarter-percent (0.25%) by weight of clay lumps, nor more than one-percent (1%) by weight of shale, nor more than five-percent (5%) of weight of laminated and/or friable particles when tested in accordance with TxDOT Tex-413-A.
3. It shall have a wear of not more than forty-percent (40%) when tested in accordance with TxDOT Tex-410-A.
4. Unless otherwise specified on the Drawings, coarse aggregate will be subjected to a five (5) cycle magnesium sulfate soundness of not more than eighteen-percent (18%) when tested in accordance with TxDOT Tex-411-A.
   a. Crushed recycled hydraulic cement concrete is not subject to the five (5) cycle soundness test.
5. When tested by approved methods, the coarse aggregate, including combinations of aggregates when used, shall conform to the grading requirements shown in Table 1.

Table 1
Coarse Aggregate Gradation

Aggregate Grade No.	Nominal Size	Percent Passing on Each Sieve								
		2 1/2	2	1 1/2	1	3/4	1/2	3/8	No. 4	No. 8
1	2”	100	80 to 100	50 to 85		20 to 40			0 to 5	
2 (467)*	1 1/2”		100	95 to 100		35 to 70		10 to 30	0 to 5	
3	1 1/2”		100	95 to 100		60 to 90	25 to 60		0 to 5	
4 (57)*	1”			100	95 to 100		25 to 60		0 to 10	0 to 5
5 (67)	3/4”				100	90 to 100		20 to 55	0 to 10	0 to 5
6 (7)	1/2”					100	90 to	40 to	0 to	0 to

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							100	70	15	5
7	3/8”						100	70 to 95	0 to 25	
8	3/8”						100	95 to 100	20 to 65	0 to 10

*Numbers in parenthesis indicate conformance with ASTM C33.

6. The Loss by Decantation as tested in accordance with TxDOT Tex-406-A and the allowable weight of clay lumps shall not exceed one-percent (1%), or the value shown on the Drawings, whichever is smaller.
   a. In the case of aggregates made primarily from crushing stone, if the material finer than the No. 200 sieve is established to be the dust of fracture and essentially free from clay or shale as established by TxDOT Tex-406-A, Part III, the limit may be increased to one and one-half percent (1.5%).
   b. When crushed limestone coarse aggregate is used in concrete pavements, the decant may not exceed one-percent (1%) but not more than three-percent (3%) if the material finer than the No. 200 sieve is determined to be at least sixty-seven percent (67%) calcium carbonate in accordance with TxDOT Tex-406-A, Part III.

C. Fine Aggregate
   1. Fine aggregate shall consist of clean, hard, durable and uncoated particles of natural or manufactured sand or a combination thereof, with or without a mineral filler.
   2. It shall be free from frozen material or injurious amounts of salt, alkali, vegetable matter or other objectionable material and it shall not contain more than half-percent (0.5%) by weight of clay lumps in accordance with TxDOT Tex-413-A.
   3. When subjected to the color test for organic impurities in accordance with TxDOT Tex-408-A, it shall not show a color darker than standard.
   4. Unless otherwise shown on the Drawings, the acid insoluble residue of the fine aggregate shall be not less than sixty-percent (60%) by weight when tested in accordance with TxDOT standard laboratory test procedure Tex-612-J and as noted in TxDOT Item 421 for all concrete subject to direct traffic.
   5. When tested in accordance with TxDOT Tex-401-A, the fine aggregate or combinations of aggregates, including mineral filler, shall conform to the grading requirements shown in Table 2.

Table 2
Fine Aggregate Gradation Chart

Aggregate Grade No.	Percent Retained on Each Sieve							
	3/8”	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200
1	0	0 to 5	0 to 20	15 to 50	35 to 75	65 to 90	90 to 100	97 to 100

NOTE 1: Where manufactured sand is used in lieu of natural sand, the percent retained on the No. 200 sieve shall be 94 to 100.

NOTE 2: Where the sand equivalent value is greater than 85, the retainage on the No. 50 sieve may be 70 to 94 percent.

6. Fine aggregate will be subjected to the Sand Equivalent Test (TxDOT Tex-203-F).

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a. The sand equivalent shall not be less than 80 nor less than the value shown on the Drawings, whichever is greater.
7. For all classes of concrete except K, the fineness modulus for fine aggregates shall be between 2.30 and 3.10 as determined by TxDOT Tex-402-A.
8. For all class K concrete, the fineness modulus for fine aggregates shall be between 2.60 and 2.80 as determined by TxDOT Tex-402-A.

D. Mineral Filler
1. Mineral filler shall consist of stone dust, clean crushed sand, or other approved inert material with 100% passing the No. 30 sieve and 65% to 100% passing the No. 200 sieve when tested in accordance with TxDOT Tex-401-A.

E. Storage
1. The method of handling and storing concrete aggregate shall prevent contamination with foreign materials.
2. If the aggregates are stored on the ground, the sites for the stockpiles shall be clear of all vegetation and level.
a. The bottom layer of aggregate shall not be disturbed or used without recleaning.
3. When conditions require the use of two (2) or more sizes of aggregates, they shall be separated to prevent intermixing.
a. Where space is limited, stockpiles shall be separated by physical barriers.
4. Methods of handling aggregates during stockpiling and subsequent use shall be such that segregation will be minimized.
a. If segregation is apparent, the stockpile shall be remixed and tested.
5. Unless otherwise authorized by the Owner, all aggregate shall be stockpiled at least twenty-four (24) hours to reduce the free moisture content.

F. Supplementary Cementing Materials (SCM)
1. Fly Ash
a. Shall conform to TxDOT DMS-4610
1) Do not use class C Fly Ash in sulfate-resistant concrete
2. Ultra-Fine Fly Ash (UFFA)
a. Shall conform to TxDOT DMS-4610
3. Ground Granulated Blast-Furnace Slag (GGBFS)
a. Shall conform to TxDOT DMS-4620, Grade 100 or 120
4. Silica Fume
a. Shall conform to TxDOT DMS-4630
5. Metakaolin
a. Shall conform to TxDOT DMS-4635

2.04 Mixing Water

1. Water for use in concrete shall be free from oils, acids, organic matter or other deleterious substances.
2. Water from municipal supplies approved by the State Health Department will not require testing, but water from other sources will be sampled and tested before use in structural concrete.
3. Water shall be in accordance with TxDOT Item 421.
a. Any testing required for approval of use is the responsibility of the Contractor.
4. The water source shall be able to supply the required amounts of water and shall be maintained in such condition to insure completion of the work under way without excessive delays for repairs or replacements.
5. The water source shall be arranged so that the amount of water can be measured accurately.

2.05 Admixtures

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1. Admixtures must be in conformance with TxDOT DMS-4640 and ASTM C 494 or ASTM C 1017 (for flowing concrete only).
   a. Any testing required for approval of use is the responsibility of the Contractor.
2. Dosage rates of admixtures shall be determined prior to use by means of trial mixes made with materials to be used and under anticipated construction conditions.
3. Calcium Chloride will not be permitted.
4. Storage shall be in accordance with the manufacturers recommendations.

2.06 Mortar and Grout

1. Mortar for repair of concrete shall consist of one (1) part hydraulic cement, two (2) parts finely graded sand, and sufficient water to make the mixture plastic and can be easily handled and spread by trowel.
2. When required to prevent color difference, white cement shall be added to produce the color required.
3. When required by the Owner, latex adhesive shall be added to the mortar.

2.07 Epoxy

1. Epoxy materials shall conform to TxDOT DMS-6100.
2. Epoxy Bonding Compound for bonding new concrete to hardened concrete or other structural material
   a. Epoxy Bonding Compound shall be a two component, 100% solids, moisture insensitive system.
3. Epoxy Grout for Epoxy patch on non-horizontal surfaces to concrete
   a. Epoxy Compound shall be a low-modulus, high viscosity, moisture insensitive system.

2.08 Expansion Joint Material

1. Preformed Fiber Material
   a. Preformed fiber expansion joint material shall be of the dimensions shown on the Drawings.
   b. At the Contractor's option, the material shall be one of the following types, unless otherwise noted on the Drawings:
      1) Asphalt Board
         a) Asphalt Board shall consist of two (2) liners of 0.016-inch asphalt impregnated paper, filled with a mastic mixture of asphalt and vegetable fiber and/or mineral filler.
         b) Boards shall be smooth, flat and sufficiently rigid to permit installation.
         c) When tested in accordance with TxDOT Tex-524-C, the asphalt board shall not deflect from the horizontal more than one inch (1”) in three and one-half inches (3 1/2”).
         d) Bituminous fiber and bituminous mastic composition material conforming to ASTM D 994 and ASTM D 1751
      2) Wood
         a) Shall be Filler board of selected stock.
         b) Use wood of density and type as follows:
            (1) Clear, all-heart cypress weighing no more than 40 pounds per cubic foot, after being oven dried to constant weight.
            (2) Clear, all-heart redwood weighing no more than 30 pounds per cubic foot, after being oven dried to constant weight.
      3) Rebonded Neoprene Filler
         a) Rebonded neoprene filler shall consist of ground closed-cell neoprene particles, rebonded and molded into sheets of uniform thickness of the dimensions shown on Drawings.

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b) Filler material shall have the physical properties in Table 3 and shall meet the requirements of ASTM D1752, Type 1 where applicable:

Table 3
Filler Material Properties

Property	Method	Requirement
Color	ASTM D1752 Type 1	Black
Density	ASTM D1752 Type 1	40 PCF Min
Recovery	ASTM D1752 Type 1	90% Min.
Compression	ASTM D1752 Type 1	50 to 500 psi
Extrusion	ASTM D1752 Type 1	0.25 In. Max.
Tensile Strength	ASTM D1752 Type 1	20 psi Min.
Elongation		75% Min

c) The manufacturers shall furnish the Owner with certified test results as to the compliance with the above requirements and a twelve-inch (12") x twelve-inch (12") x one-inch (1") sample from the shipment for approval.

2. Joint Sealing Materials
   a. Unless otherwise shown on the Drawings, joint sealing material shall conform to the following requirements:
      1) The material shall adhere to the sides of the concrete joint or crack and shall form an effective seal against infiltration of water and incompressible.
      2) The material shall not crack or break when exposed to low temperatures.
      3) The material shall be one of the following:
         a) Class 1-a
            (1) Two component, Synthetic Polymer, Cold Extruded Type.
            (2) Curing is to be by polymerization and not by evaporation of solvent or fluxing of harder particles.
            (3) This type is specifically designed for vertical or sloping joints and hence not self-leveling.
            (4) It shall cure sufficiently at an average temperature leveling.
            (5) It shall cure sufficiently at an average temperature of 77° F, ± 3° F maximum for twenty-four (24) hours.
         b) Class 1-b
            (1) Two component, Synthetic Polymer, Cold Pourable, Self Leveling Type.
            (2) Curing is to be by polymerization and not by evaporation of solvent or fluxing of harder particles.
            (3) It shall cure sufficiently at an average temperature of 77° F ± 3° F maximum for three (3) hours.
         c) For Sidewalks and Driveways
            (1) Shall be Greenstreak #610 or approved equal installed over expansion joint filler.
      4) Performance Requirements
         a) Class 1-a and 1-b, when tested in accordance with TxDOT Tex-525-C, shall meet the above curing times and requirements as follows:
            (1) It shall be of such consistency that it can be mixed and poured, or mixed and extruded into joints at temperatures above 60° F.
            (2) Penetration at 77° F.
               (a) 150 gm. cone, 5 sec., max. cm.....0.90
            (3) Bond and Extension 75%, O° F, 5 cycles

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(a) Dry Concrete Blocks.....Pass
(b) Wet Concrete Blocks.....Pass
(c) Steel Blocks (Primed if specified by Manuf.)...Pass
(d) Flow at 200° F.....None
(e) Water Content % by weight, max.....5.0

(4) Resilience
(a) Original sample min. % (cured).....50
(b) Oven aged at 158° F min. % 50

(5) For Class 1-a Material Only
(a) Cold Flow (10 min.).....None

b) Greenstreak #610

(1) Provide flexible, modified PVC (polyvinyl chloride) “G-SEAL” as manufactured by Greenstreak, profile style number 610.

(2) The modified PVC paving cap seal shall be extruded from an elastomeric plastic material of which the basic resins are prime virgin materials. The compound shall not contain any scrapped or reclaimed material whatsoever.

(3) Performance Requirements as noted in Table 4:

Table 4
Performance Requirements

Property	Test Method	Requirements
Tensile Strength	ASTM D412-92	2350 psi min.
Elongation	ASTM D412-92	375% min.
Hardness	ASTM D2240-95	81+/-3 Shore A
Oil Swell (ASTM Oil #3, 70 hrs @ 212° F change in volume/weight)	ASTM D471-95	+/- 15% by vol. +/- 15% by wt.
Ozone Resistance (20% strain, 300 pphm, 70 hrs @ 104° F)	ASTM D518-91	No Cracking
UV Resistance (2000hrs @ 70° F)	ASTM G53	2200 psi minimum 200% minimum
Abrasion Resistance (10,500 cycles, 1000 g load)	ASTM D 3884	Material Loss: -0.35 grams max.
Adhesive Bond Strength	ASTM D412-92	1000 psi min.
Results after Heat Aging (24 hrs @ 70° F)	ASTM D573	Tensile Strength retained: 90% Elongation retained: 90% Hardness change: +/-3 Shore A

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PART 3 - EXECUTION

3.01 General

A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.

3.02 Forms

A. General
   1. Shall be in accordance with Section 03 11 13.11 CONCRETE FORMS
   2. Opening in forms shall be provided, if needed, for the removal of laitance of foreign matter of any kind.
   3. All forms shall be wetted thoroughly before the concrete is placed therein.
   4. If, at any stage of the work, the forms show signs of bulging or sagging, the portion of the concrete causing such condition shall be removed immediately, if necessary, and the forms shall be reset and securely braced against further movement.

3.03 Reinforcing Steel

A. Shall be in accordance with Section 03 21 11 REINFORCING STEEL

3.04 Equipment

A. Concrete Plant
   1. Certified by the National Ready Mixed Concrete Association (NRMCA) or have an inspection report signed and sealed by a Licensed Professional Engineer in the State of Texas showing that the equipment meets all requirements of ASTM C94.
      a. If the Plant is moved, it must be recertified.
      b. Plants with a licensed engineer’s inspection are required to be reinspected every two (2) years.
      c. Provide a copy of the certification to the Owner’s representative.
      d. When equipment fail to meet requirements it shall be removed from service and corrected.
   2. The batching Plant shall be provided with adequate bins for batching all aggregates and materials required by the specifications.

B. Mixing Equipment
   1. General
      a. All equipment, tools, and machinery used for mixing materials and performing any part of the work shall be maintained in such condition to insure completion of the work under way without excessive delays for repairs or replacements.
      b. When equipment fail to meet specification requirements it shall be removed from service and corrected.
      c. Mixers may be either the revolving drum type or the revolving blade type, and shall be capable of producing concrete meeting the required specifications.
         1) The mixer shall have a plate affixed showing the manufacturer's recommended operating data.
      d. Job mix concrete shall be concrete mixed in an approved batch mixer in accordance with the requirements of this specification, adjacent to the structure for which the

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concrete is being mixed, and moved to the placement site, in non-agitating equipment.

2. Mixers and Agitators
   a. General
      1) Mixers shall be of an approved stationary or truck-type.
   b. Volumetric Mixers
      1) Capable of combining the materials into a thoroughly mixed and uniform mass.
      2) Shall have rating plates defining the capacity and the performance of the mixers in accordance with the Volumetric Mixer Manufacturers Bureau or equivalent.
      3) Mixers shall comply with ASTM C685.
      4) Provide information showing the mixers meet the uniformity test requirements of TxDOT Tex-472-A.
   c. Stationary Mixers
      1) Capable of combining the ingredients into a thoroughly mixed and uniform mass within the specified time or the number of revolutions specified and capable of discharging concrete which satisfies five (5) of the six (6) requirements of TxDOT Tex-472-A.
      2) Facilities shall be provided to permit ready access to the inside of the drum for inspection, cleaning and repair of blades.
      3) Mixer shall be subject to daily examination for changes in condition due to accumulation of hardened concrete and/or wear of blades.
         a) Any hardened concrete shall be removed before the mixer will be permitted to be used.
         b) Worn blades shall be repaired or replaced in accordance with the manufacturer's design when any part or section is worn as much as ten percent (10%) below the original height of the manufacturer's design.
      4) If deemed not adequate or suitable for the work, it shall be removed from the site upon a written order from the Owner and a suitable mixer shall be provided by the Contractor.
      5) Truck mixers mounted on a stationary base will not be considered a stationary mixer.
   d. Truck Mixer
      1) Capable of combining the ingredients into a thoroughly mixed and uniform mass within the specified time or the number of revolutions specified and capable of discharging concrete which satisfies five (5) of the six (6) requirements of TxDOT Tex-472-A.
      2) Certified by the National Ready Mixed Concrete Association (NRMCA) or have an inspection report signed and sealed by a Licensed Professional Engineer in the State of Texas showing that the equipment meets all requirements of ASTM C94.
      3) Facilities shall be provided to permit ready access to the inside of the drum for inspection, cleaning and repair of blades.
      4) Mixer shall be subject to daily examination for changes in condition due to accumulation of hardened concrete and/or wear of blades.
         a) Any hardened concrete shall be removed before the mixer will be permitted to be used.
         b) Worn blades shall be repaired or replaced in accordance with the manufacturer's design when any part or section is worn as much as ten percent (10%) below the original height of the manufacturer's design.

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5) If deemed not adequate or suitable for the work, it shall be removed from the site upon a written order from the Owner and a suitable mixer shall be provided by the Contractor.
6) An engine in satisfactory working condition and capable of accurately going the desired speed of rotation shall be mounted as an integral part of the mixing unit for the purpose of rotating the drum.
7) Truck mixers equipped with a transmission that will govern the speed of the drum within the specified rpm will not require a separate engine.
8) All truck mixers shall be equipped with actuated counters by which the proper number of revolutions of the drum as specified may be readily verified.
   a) Counters
      (1) Truck mixers will be permitted to transport concrete to the job site at mixing speed if equipped with double actuated counters that will separate revolutions at mixing speed from total revisions.
      (2) Truck mixers equipped with a single actuated counter counting total revolutions of the drum shall mix the concrete at the Plant not less than fifty (50) nor more than seventy (70) revolutions at mixing speed, transport it to the job site at agitating speed and complete the required mixing before placing the concrete.
   b) The counters shall be read and recorded at the start of mixing at mixing speeds.
9) Shall have adequate water supply and accurate metering or gauging devices for measuring the amount used.

e. Agitators
   1) Concrete agitators shall be of the truck type, capable of maintaining a thoroughly mixed and uniform concrete mass and discharging it within the same degree of uniformity specified for mixers.
   2) Agitators shall comply with all of the requirements for truck mixers, except for the actual mixing requirements.

C. Hauling Equipment
   1. All equipment, tools, and machinery used for hauling materials and performing any part of the work shall be maintained in such condition to insure completion of the work under way without excessive delays for repairs or replacements.
   2. Certified by the National Ready Mixed Concrete Association (NRMCA) or have an inspection report signed and sealed by a Licensed Professional Engineer in the State of Texas showing that the equipment meets all requirements of ASTM C-94.
      a. Equipment with a licensed engineer’s inspection is required to be reinspected every two (2) years.
      b. Provide a copy of the certification to the Owner’s representative.
      c. When equipment fail to meet requirements it shall be removed from service and corrected.
   3. Provide equipment capable of maintaining the mixed concrete with a satisfactory degree of uniformity.
   4. When using non-agitating equipment for transporting concrete, provide equipment with smooth, mortar tight metal containers equipped with gates that prevent accidental discharge.

D. Placing Equipment
   1. The method and equipment used to transport concrete to the forms shall be capable of maintaining the rate of placement approved by the Owner.
      a. Concrete may be transported by buckets, chutes, buggies, belt conveyors, pumps or other acceptable methods.

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b. Chutes, troughs, conveyors or pipes shall be arranged and used so that the concrete ingredients will not be separated.
c. All transporting equipment shall be kept clean and free from hardened concrete coatings.
    1) Water used for cleaning shall be discharged clean of the concrete.
d. Belt Conveyors and Pumps
    1) When belt conveyors or pumps are used, sampling for testing will be done at the discharge end.
    2) Concrete transported by conveyors shall be protected from sun and wind, if necessary, to prevent loss of slump and workability.
e. Pipes
    1) Pipes through which concrete is pumped shall be shaded and/or wrapped with wet burlap, if necessary, to prevent loss of slump and workability.
    2) Concrete shall not be transported through aluminum pipes, tubes or other aluminum equipment.
f. Troughs and Chutes
    1) When steep slopes are necessary, the chutes shall be equipped with baffle boards or made in short lengths that reverse the direction of movement, or the chute ends shall terminate in vertical downspouts.
    2) Open troughs and chutes shall extend, if necessary, down inside the forms or through holes left in them.

E. Scales
1. Check prior to use, after each move, or whenever the accuracy or adequacy is questioned, and at least once every six (6) months.
2. Immediately correct deficiencies and recalibrate.
3. Provide a record of calibration showing the scales are in compliance with ASTM C94.
4. Check batching accuracy of volumetric water batching devices and admixture dispensing devices at least every ninety (90) days.
5. Perform daily checks as needed to confirm accuracy.

F. Testing Equipment
1. Shall be provided in accordance with the requirements of the tests and in working condition to provide accurate information.

3.05 Classification and Mix Design

A. General
a. It shall be the responsibility of the Contractor to furnish the mix design, for the class(es) of concrete specified.
b. The mix shall be designed by a qualified concrete technician to conform with the requirements contained herein and in accordance with ACI 211.
c. The Contractor shall perform, at his own expense, the work required to substantiate the design.
d. It shall also be the responsibility of the Contractor to determine and measure the batch quantity of each ingredient, including all water, so that the mix conforms to these specifications and any other requirements shown on the Drawings.
e. In lieu of the above mix design responsibility, the Contractor may accept a design furnished by the Owner; however, this will not relieve him of providing concrete meeting the requirements of these specifications.

B. Aggregate
a. Coarse Aggregate Factor
    1) The coarse aggregate factor shall not be more than 0.82, except that when the voids in the coarse aggregate exceed forty-eight percent (48%) of the total dry loose volume, the coarse aggregate factor shall not exceed 0.85.

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2) The coarse aggregate factor shall not be less than 0.70 for Grades 1, 2 and 3 aggregate.

b. Recycled Aggregate

1) Limit recycled crushed hydraulic cement concrete as a coarse or fine aggregate to Class A, B, D, E, and P concrete.

2) Limit recycled crushed concrete fine aggregate to a maximum of twenty percent (20%) of the fine aggregate.

C. Strength

1. If the strength required for the class of concrete being produced is not secured with the cement specified in Table 5, the Contractor may use an approved water reducing or retarding admixture, or the Contractor shall furnish aggregates with different characteristics that will produce the required results.

Table 5

Classes of Concrete

Class of Concrete	Design Strength[1] (psi)	Maximum Water to Concrete Ratio[2]	Coarse Aggregate Grades[3,4]	General Usage[5]
A	3,000	0.60	1-4, 8	Inlets, Manholes, Curb, Gutter, Curb & gutter, Concrete retards, Sidewalks, Driveways, Backup walls, Anchors
B	2,000	0.60	2-7	Riprap, Small roadside signs, and Anchors
C	3,600	0.45	1-6	Drilled shafts, Bridge Substructure, Bridge railing, Culverts (except top slab of direct traffic culverts), Headwalls, Wing walls, Approach slabs, Concrete traffic barrier (cast-in-place)
D	1,500	0.60	2-7	Riprap
E	3,000	0.50	2-5	Seal Concrete
F[6]	4,000 min Or as Noted on Drawings	0.45	2-5	Railroad structures; occasionally for bridge piers, columns, or bents
H[6]	4,000 min	0.45	3-6	Prestressed concrete beams, Boxes, Piling, Concrete traffic barrier (precast)

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	Or as Noted on Drawings			
S[6]	4,000 min Or as Noted on Drawings	0.45	2-5	Bridge slabs, Top slabs of direct traffic culverts
P	4,000 min Or as Noted on Drawings	0.45	2-3	Concrete pavement
DC[6]	5,500 min Or as Noted on Drawings	0.40	6	Dense concrete overlay
CO[6]	4,600 min Or as Noted on Drawings	0.40	6	Latex-modified concrete overlay
LMC[6]	4,000 min Or as Noted on Drawings	0.40	6-8	Slurry displacement shafts, Underwater drilled shafts

[1] – minimum twenty-eight (28) day f'c for all types of cement

[2] – Maximum water-cement or water-cementations ratio by weight

[3] – Do not use Grade 1 coarse aggregate except as approved by Owner, may not be used in Drilled shafts

[4] – Unless otherwise approved, use Grade 8 coarse aggregate in extruded curbs.

[5] – For information only, see Drawings and appropriate specifications for required class

[6] – Structural Concrete Classes

2. A higher class of concrete with equal or lower water to cementations material ratio may be substituted for the specified class of concrete.
3. To account for production variability and to ensure minimum compressive strength requirements are satisfied, the mix shall be over-designed in accordance with Table 6.

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Table 6

Over Design Compressive Strength Requirements

No. of Tests	Standard Deviation (psi)				
	300	400	500	600	700
15	470	620	850	1,120	1,390
20	430	580	760	1,010	1,260
30 +	400	530	670	900	1,130

Note: When designing the mix the values above shall be added to the minimum design strength in Table 5

Number of tests of a concrete mixture used to estimate

D. Cementations Material
   1. Unless otherwise specified or approved, limit cementations material content to no more than 700 lb per cubic yard.
   2. Use only Type III cement only in precast concrete or when specified or permitted.

E. Admixtures
   1. Water Reducing or Retarding Agents
      a. Water reducing or retarding agents may be used with all classes of concrete at the option of the Contractor.
      b. When water reducing or retarding agents are used at the option of the Contractor, reduced dosage of the admixture will be permitted.
   2. Entrained Air Agents
      a. Entrained air will be required in all concrete, except Class B, in accordance with Table 7 unless otherwise shown on the Drawings.

Table 7

Air Entrainment

Aggregate Grade No.	% Air	
	Moderate Exposure	Severe Exposure
1	4	5
2	4 1/2	5 1/2
3	4 1/2	5 1/2
4	4 1/2	6
5	5	6
6	5 1/2	7
7	6	7 1/2

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8	6	7 1/2
1. For specified concrete strengths above 5,000 psi a reduction of one (1) percentage point is permitted.		

b. Tolerances
   1) Shall contain the proper amount as required in Table 7 with a tolerance of plus or minus one and one-half percentage (1 1/2%) points.
   2) If the amount is beyond the above tolerance then the load of concrete will be rejected.

F. Consistency
   1. General
      a. The concrete shall be workable, cohesive, possess satisfactory finishing qualities, and of the stiffest consistency that can be placed and vibrated into a homogenous mass.
      b. The consistency of the concrete as placed should allow the completion of all finishing operations without the addition of water to the surface.
      c. Excessive bleeding shall be avoided.
      d. Modifications
         1) In cases where the consistency requirements cannot be satisfied without exceeding the maximum allowable amount of water, the Contractor may use, or the Owner may require, an approved water reducing or retarding agent or the Contractor shall furnish additional aggregates, or aggregates with different characteristics, which will produce the required results.
         2) Additional cement may be required or permitted as a temporary measure until aggregates are changed and designs checked with the different aggregates or admixture.

   2. Slump
      a. Slump shall be in accordance with Table 8 using the lowest slump possible that can be placed and finished efficiently without segregation or honeycombing.

Table 8

Slump Requirements

Class of Concrete	Concrete Use	Recommended Design And Placement Slump [1] (inch)	Maximum Design and Placement Slump [2] (inch)
A B D	Inlets, Manholes, Curb, Gutter, Curb & gutter, Concrete retards, Sidewalks, Driveways, Backup walls, Anchors, Riprap, Small road signs, Slip-formed, Extruded	2.5 *or* Owner Approved	4 *or* Owner Approved

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C F	Thin Walled Section (9 inch or less)	4	5
	Approach slabs, Concrete overlays, Caps, Columns, Piers, Wall sections (over 9 inch)	3	4
	Bridge railing, Concrete traffic barrier (cast-in-place)	4	6 1/2
	Drilled shafts (dry)	6 1/2	7 1/2
	Drilled shafts (underwater, under slurry)	5	6
H	Prestressed concrete beams, Boxes, Piling, Concrete traffic barrier (precast)	4	6 1/2
S	Bridge slabs, Top slabs of direct traffic culverts	4	5 1/2
P	Concrete pavement (slip-formed)	1 1/2	3
	Concrete pavement (formed)	4	6 1/2
DC	Dense concrete overlay	3/4	2
CO	Latex-modified concrete overlay	3	7 1/2
LMC	Slurry displacement shafts, Underwater drilled shafts	6	8 1/2

[1] – Recommended design and placement slump shall be as shown or as approved by Owner

[2] – Maximum design and placement slump shall be as shown or as approved by Owner

b. Concrete that exceeds the maximum acceptable slump at time of delivery will be rejected.
c. When approved, the slump may be increased above the values shown in Table 8 using chemical admixtures, provided that the admixture-treated concrete has the same or lower water-cement or water-cementations material ratio and does not exhibit segregation or excessive bleeding.
    1) Mix design must be approved by the Owner.

G. Mix Design Options
    1. Shall be in accordance with TxDOT Item 421.
H. Sulfate-Resistant Concrete
    1. When sulfate-resistant concrete is required, use mix design options 1, 2, 3, or 4 given in below using Type I/II, II, V, IP, or IS cement in accordance with ACI 318.
        a. Option 1

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1) Replace twenty percent (20%) to thirty-five percent (35%) of the cement with Class F fly ash.

b. Option 2
1) Replace thirty-five percent (35%) to fifty percent (50%) of the cement with Ground Granulated Blast-Furnace Slag

c. Option 3
1) Replace thirty-five percent (35%) to fifty percent (50%) of the cement with a combination of Class F fly ash, Ground Granulated Blast-Furnace Slag, or silica fume.

d. Option 4
1) Use Type IP or Type IS cement. (Up to ten percent (10%) of a Type IP or Type IS cement may be replaced with Class F fly ash, Ground Granulated Blast-Furnace Slag, or silica fume.)

2. Do not use Class C Fly Ash in sulfate-resistant concrete

I. Trial Batches
1. Trial batches will be made and tested using all the proposed ingredients prior to the placing of concrete, and when the aggregate and/or brand of cement or admixture are changed.
2. Trail batches shall be in accordance with TxDOT 421.
3. Trial batches shall be made in the mixer to be used on the job.
4. When Transit Mix concrete is to be used, the trial designs will be made in a transit mixer representative of the mixers to be used.
a. Batch size shall not be less than fifty percent (50%) of the rated mixing capacity of the truck.
5. Mix designs from previous or concurrent jobs may be used without trial batches if it is shown that no substantial change in any of the proposed ingredients has been made.

3.06 Mixing

A. Mixing Conditions
1. General
a. The concrete shall be mixed in quantities required for immediate use.
2. Weather
a. In threatening weather, which may result in conditions that will adversely affect quality of the concrete to be placed, the Owner may order postponement of the work.
b. Where work has been started and changes in weather conditions require protective measures, the Contractor shall furnish adequate shelter to protect the concrete against damage from rainfall, or from freezing temperatures.
c. If necessary to continue operations during rainfall, the Contractor shall also provide protective coverings for the material stockpiles.
d. Aggregate stockpiles need be covered only to the extent necessary to control the moisture conditions in the aggregates to adequately control the consistency of the concrete.

B. Mixing
1. General
a. The mixing shall be done in a batch mixer of approved type and size that will produce uniform distribution of the material throughout the mass.
b. After all the ingredients are assembled in the drum, the mixing shall continue not less than one (1) minute for mixers of one (1) cubic yard or less capacity plus fifteen (15) seconds for each additional cubic yard or portion thereof.
c. The mixer shall operate at the speed and capacity designated by the Mixer Manufacturers Bureau of the Associated General Contractors of America.

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d. The absolute volume of the concrete batch shall not exceed the rated capacity of the mixer.
e. The entire contents of the drum shall be discharged before any materials are placed therein for the succeeding batch.
f. The first batch of concrete materials placed in the mixer for each placement shall contain an extra quantity of sand, cement, and water sufficient to coat the inside surface of the drum.
g. Upon the cessation of mixing for any considerable length of time, the mixer shall be thoroughly cleaned.

2. Mixing Water
   a. A portion of the mixing water, required by the batch design to produce the desired slump, may be withheld and added at the job site, but only with permission of the Owner and under his supervision.
   b. When water is added under the above conditions, it shall be thoroughly mixed in accordance with this specification delivery provision for water added at the job site.
3. Ready-Mix Plants
   a. General
      1) It shall be the Contractor's responsibility to furnish concrete meeting all requirements of the governing specifications.
   b. Mixing
      1) Ready-Mixed Concrete shall be mixed and delivered by means of one of the following approved methods.
      2) Mixers
         a) Stationary Mixed
            (1) Mixed completely in a stationary mixer and transported to the point of delivery in a truck agitator or a truck mixer operating at agitator or a truck mixer operating at agitation speed. (Central-Mix Concrete)
            (2) Mixed completely in a stationery mixer and transported to the job site in approved non-agitating trucks with special bodies. This method of transporting will be permitted for concrete pavement only.
         b) Truck Mixed
            (1) Mixed complete in a truck mixer and transported to the placement site at mixing and/or agitating speed (Transit-Mix Concrete), subject to the requirements of Mixing Equipment within this specification.

3.07 Quality of Concrete

A. General
   1. The concrete shall be uniform and workable.
   2. Improperly mixed concrete shall not be placed in the structure.
   3. The cement content, maximum allowable water cement ratio, the desired and maximum slump and the strength requirements of the various classes of concrete shall conform to the requirements herein.
   4. Sampling and Testing
      a. During the process of the work, the Owner or Inspector will require the Contractor to test the concrete actually placed.
      b. Testing Requirements
         1) Testing Rate shall be in accordance with Table 9:

Table 9

Testing Schedule

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Class of Concrete	Testing Rate [1, 2]	General Usage [3]
A	1 Set Per 500 Linear Feet or less	Curb, Gutter, Curb & gutter
	1 Set Per 4,000 Square Feet or less	Sidewalks, Driveways
	1 Set Per 6 or less	Inlets, Manholes
	1 Set Per 30 cubic yards or less Or As required by Drawings and / or Owner	Concrete retards, Backup walls, Anchors
B	1 Set Per 50 cubic yards or less	Riprap, Small roadside signs
	1 Set Per 30 cubic yards or less Or As required by Drawings and / or Owner	Anchors
C	1 Set Per 30 cubic yards or less or As required by Drawings and / or Owner	Culverts (except top slab of direct traffic culverts), Headwalls, Wing walls
	As required by Drawings and / or Owner	Drilled shafts, Bridge Substructure, Bridge railing, Culverts (except top slab of direct traffic culverts), Headwalls, Wing walls, Approach slabs, Concrete traffic barrier (cast-in-place)
D	1 Set Per 50 cubic yards or less	Riprap

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E	As required by Drawings and / or Owner	Seal Concrete
F	As required by Drawings and / or Owner	Railroad structures; occasionally for bridge piers, columns, or bents
H	As required by Drawings and / or Owner	Prestressed concrete beams, Boxes, Piling, Concrete traffic barrier (precast)
S	As required by Drawings and / or Owner	Bridge slabs, Top slabs of direct traffic culverts
P	1 Set Per 30 cubic yards or less or As required by Drawings and / or Owner	Concrete pavement
DC	As required by Drawings and / or Owner	Dense concrete overly
CO	As required by Drawings and / or Owner	Latex-modified concrete overly
LMC	As required by Drawings and / or Owner	Slurry displacement shafts, Underwater drilled shafts

[1] – For information only, see Drawings and appropriate specifications for required class

[2] – Test rates are per day of work unless Owner approves otherwise

[3] – For information only, see Drawings and appropriate specifications for required class

2) Testing of Fresh Concrete
   a) Air Content
      (1) In accordance with TEX-414-A or TEX-416-A
   b) Slump
      (1) In accordance with TEX-415-A
   c) Temperature
      (1) In accordance with TEX-422-A
   d) Making and Curing Strength Specimens
      (1) In accordance with TEX-447-A
3) Testing of Hardened Concrete
   a) Compressive Strength
      (1) In accordance with TEX-418-A
   b) Flexural Strength
      (1) In accordance with TEX-448-A
   c) Maturity
      (1) In accordance with TEX-426-A

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c. The Contractor shall provide and maintain curing facilities as described in the appropriate test procedure for the purpose of curing test specimens.
   1) It will be the responsibility of the Contractor to ensure that the test cylinders are handled in a manner to ensure that the test results are accurate.
d. When control of concrete quality is by twenty-eight (28) day compressive tests, job control will be by seven (7) day compressive tests that are shown to provide the required twenty-eight (28) day strength, based on results from trial batches.
e. If the required seven (7) day strength is not secured with the cement specified in the mix design, changes in the batch design shall be made
f. All test results shall be sent to the Owner upon completion of test.

3.08 Expansion Joints

A. Joints and devices to provide for expansion and contraction shall be constructed where and as indicated herein or on the Drawings.
B. All open joints and joints to be filled with expansion joint material, shall be constructed using forms adaptable to loosening or early removal.
C. To avoid expansion or contraction damage to the adjacent concrete, these forms shall be loosened as soon as possible after final concrete set to permit free movement without requiring full form removal.
D. Prior to placing the sealing material, the vertical facing the joint shall be cleaned of all laitance by sandblasting or by mechanical routing.
E. Cracked or spalled edges shall be repaired.
F. The joint shall be blown clean of all foreign material and sealed.
G. Where preformed fiber joint material is used, it shall be anchored to the concrete on one side of the joint by light wire or nails, to prevent the material from falling out.
H. The top one-inch (1”) of the joint shall be filled with joint sealing material.
I. Finished joints shall conform to the indicated outline with the concrete sections completely separated by the specified opening or joint material.
J. Soon after form removal and again where necessary after surface finishing, all projecting concrete shall be removed along exposed edges to secure full effectiveness of the expansion joints.

3.09 Construction Joints

A. The joint formed by placing plastic concrete in direct contact with concrete that has attained its initial set shall be deemed a construction joint.
B. The term monolithic placement shall be interpreted to mean at the manner and sequence of concrete placing shall not create construction joints.
C. Construction joints shall be of the type and at the locations shown on the Drawings.
D. Additional joints will not be permitted without written authorization from the Owner, and when authorized, shall have details equivalent to those shown on the Drawings for joints in similar locations.
E. Unless otherwise provided, construction joints shall be square and normal to the forms.
F. Bulkheads shall be provided in the forms for all joints, except when horizontal.
G. Construction joints requiring the use of joint sealing material shall be as detailed on the Drawings.
H. The material will be specified on the Drawings without referenced to joint type.
I. A concrete placement terminating at a horizontal construction joint shall have the top surface roughened thoroughly as soon as practicable after initial set is attained.
J. The surfaces at bulkheads shall be roughened as soon as the forms are removed.
K. The hardened concrete surface shall be thoroughly cleaned of all loose material, laitance, dirt or foreign material and saturated with water so it is moist when placing fresh concrete against it.
L. Forms shall be drawn tight against the placing of the fresh concrete.

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3.10 Delivery of Concrete

A. General
   1. Delivery of concrete shall equal or exceed the rate approved by the Owner for continuous placement.
   2. In all cases, the delivery of concrete to the placement site shall assure compliance with the time limits in the applicable specification for depositing successive batches in any monolithic unit.
   3. The Contractor shall satisfy the Owner that adequate standby equipment are available.

B. Delivery Tickets
   1. A standard ticket system will be used for recording concrete batching, mixing and delivery date.
   2. Loads arriving without ticket and/or in unsatisfactory condition shall not be used.
   3. Tickets will be delivered to the job inspector.

C. Mixers
   1. General
      a. When Ready-Mix Concrete is used, additional mortar (one (1) sack cement, three (3) parts sand and sufficient water) shall be added to the batch to coat the drum of the mixer or agitator truck and this shall be required for every load of Class C concrete only and for the first batch from central mix Plants.
   2. Stationary Mixer
      a. When a stationary mixer is used for the entire mixing operation, the mixing time for one (1) cubic yard of concrete shall be one (1) minute plus fifteen (15) seconds for each additional cubic yard or portion thereof.
      b. This mixing time shall start when all cement, aggregates and initial water have entered the drum.
      c. The mixer shall be charged so that some of the mixing water will enter the drum in advance of the cement and aggregate.
      d. All of the mixing water shall be in the drum by the end of the first one-fourth (1/4) of the specified mixing time.
      e. Water used to flush down the blades after charging shall be accurately measured and included in the quantity of mixing water.
      f. The introduction of the initial mixing water, except blade wash down water and that permitted in this specification, shall be prior to or simultaneous with the charging of the aggregates and cement.
      g. The drum shall be kept in continuous motion from the time mixing is started until the discharge is completed.

D. Truck Mixers
   1. The loading of truck mixers shall not exceed sixty-three percent (63%) of the total volume of the drum.
   2. When used as an agitator only, the loading shall not exceed eighty percent (80%) of the drum volume.
   3. The drum shall be kept in continuous motion from the time mixing is started until the discharge is completed.

E. Mixing Speed and Revolutions
   1. Mixing speed shall be attained as soon as all ingredients are in the mixer, and each complete batch (containing all the required ingredients) shall be mixed not less than seventy (70) nor more than one-hundred (100) revolutions of the drum at mixing speed
      a. Except that when water is added at the job site, twenty-five (25) revolutions (minimum) at mixing speed, will be required to uniformly disperse the additional water throughout the mix.
   2. Mixing speed shall be as designated by the manufacturer.

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3. All revolutions after the prescribed mixing time shall be at agitating speed.
4. The agitating speed shall be not less than one (1) nor more than five (5) rpm.

3.11 Placing Concrete

A. General
   a. Before starting work, the Contractor shall inform the Owner fully of the construction methods he proposes to use, the adequacy of which shall be subject to the approval of the Owner.
   b. The Contractor shall give the Owner sufficient advance notice before placing concrete in any unit of the structure to permit the inspection of forms, reinforcing steel placement, and other preparations.
   c. Concrete shall not be placed in any unit prior to the completion of formwork and placement of reinforcement therein.
   d. Concrete mixing, placing and finishing shall be done in daylight hours, unless adequate provisions are made to light the entire site of all operations.
   e. Concrete placement will not be permitted when impending weather conditions will impair the quality of the finish work.
      1) If rainfall should occur after placing operations are started, the Contractor shall provide ample covering to protect the work.
      2) In case of drop in temperature, the provisions set forth in the "Placing Concrete in Cold Weather" of this specification shall be applied.
   f. Concrete not meeting the slump, workability and consistency requirements of the governing specification, shall not be placed in the structure or pavement.
   g. Any concrete that is not in place within the limits outlined in shall not be used.
   h. The placing shall be regulated so the pressures caused by the plastic concrete shall not exceed the loads used in form design.
   i. The method of handling, placing and consolidation of concrete shall minimize segregation and displacement of the reinforcement, and produce a uniformly dense and compact mass.
   j. Concrete shall not have a free fall of more than five feet (5’), except in the case of thin walls such as in culverts.
      1) Any hardened concrete spatter ahead of the plastic concrete shall be removed.
   k. The method and equipment used to transport concrete to the forms shall be capable of maintaining the rate of placement approved by the Owner.
   l. Each part of the forms shall be filled by depositing concrete as near its final position as possible.
      1) The coarse aggregate shall be worked back from the face and the concrete forced under and around the reinforcement bars without displacing them.
      2) Depositing large quantities at one point and running or working it along the forms will not be allowed.
   m. Concrete shall be deposited in the forms in layers of suitable depth but not more than thirty-six inches (36”) in thickness, unless otherwise directed by the Owner.
   n. An approved retarding agent shall be used to control stress cracks and/or unauthorized cold joints in mass placements where differential settlement and/or setting time may induce stress cracking.

B. Temperature and Time Allowances
   1. The minimum temperature of all concrete at the time of placement shall be not less than 50° F.
   2. The consistency of the concrete as placed should allow the completion of all finishing operations without the addition of water to the surface unless in accordance with section 03 35 29.13 CONCRETE FINISHING.

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3. The maximum time interval between the addition of cement to the batch, and the placing of concrete in the forms shall not exceed the time in Table 10:

Table 10
Maximum Time Interval between
Addition of Cement to Placing

Air or Concrete Temperature	Maximum Time
Non-Agitated Concrete	
Up to 80° F	30 minutes
Over 80° F	15 minutes
Agitated Concrete	
90° F or above	45 minutes
75° F to 89° F	60 minutes
35° F to 74° F	90 minutes

4. The use of an approved retarding agent in the concrete will permit the extension of each of the temperature-time maximums shown in Table 10:
   a. Thirty (30) minutes for direct traffic culverts,
   b. One (1) hour for all other concrete except that the maximum time shall not exceed thirty (30) minutes for non-agitated concrete.
5. The sequence of successive layers or adjacent portions of concrete shall be such that they can be vibrated into a homogenous mass with the previously placed concrete without a cold joint.
   a. Not more than one (1) hour shall elapse between adjacent or successive placement of concrete.
   b. Authorized construction joints shall be avoided by placing all concrete between the authorized joints in one (1) continuous operation.
6. Consolidation
   a. All concrete shall be well consolidated and the mortar flushed to the form surfaces by continuous working with immersion type vibrators.
   b. Vibrators that operate by attachment to forms or reinforcement will not be permitted, except on steel forms.
   c. At least one (1) stand-by vibrator shall be provided for emergency use in addition to the ones required for placement.
   d. The concrete shall be vibrated immediately after deposit.
   e. Prior to the beginning of work, a systematic spacing of the points of vibration shall be established to insure complete consolidation and through working of the concrete around the reinforcement, embedded fixtures, and into the corners and angles of the forms.
   f. Immersion type vibrators shall be inserted vertically, at point eighteen inches (18) to thirty inches (30) apart, and slowly withdrawn.
   g. The vibrator may be inserted in a sloping or horizontal position in shallow slabs.
   h. The entire depth of each lift shall be vibrated, allowing the vibrator to penetrate several inches into the preceding lift.
   i. Concrete along construction joints shall be thoroughly consolidated by operating the vibrator along and close to but not against the joint surface.
   j. The vibration shall continue until thorough consolidation, and complete embedment of reinforcement and fixtures is produced, but not long enough to cause segregation.
   k. Vibration may be supplemented by hand spading or rodding, if necessary, to insure the flushing of mortar to the surface of all forms.

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7. Slab concrete shall be mixed in a Plant located off the structure.
    a. Carting or wheeling concrete batches over completed slabs will not be permitted until they have aged at least four full curing days.
    b. If carts are used, timber Planking will be required for the remainder of the curing period.
    c. Carts shall be equipped with pneumatic tires.
    d. Curing operations shall not be interrupted for the purpose of wheeling concrete over finished slabs.
8. After concrete has taken its initial set, at least one (1) curing day shall elapse before placing strain on projecting reinforcement to prevent damage to the concrete.

C. Placing Concrete in Cold Weather
1. General
    a. Concrete shall be placed as recommended in ACI 306.
    b. The Contractor is responsible for the protection of concrete placed under any and all weather conditions.
    c. Permission given by the Owner for placing during freezing weather will in no way relieve the Contractor of the responsibility for producing concrete equal in quality to that placed under normal conditions.
    d. Should concrete placed under such conditions prove unsatisfactory, it shall be removed and replaced at no additional cost.
2. Cast-in-Place Concrete
    a. Concrete may be placed when the atmospheric temperature is not less than 40° F and rising.
    b. Concrete shall not be placed in contact with any material coated with frost or having a temperature less than 32° F.
    c. When required, in order to produce the minimum specified concrete temperature, the aggregate and/or the water shall be heated uniformly, in accordance with the following:
        1) The water temperature shall not exceed 180° F, and/or the aggregate temperature shall not exceed 150° F.
        2) The heating apparatus shall heat the mass of aggregate uniformly.
        3) The temperature of the mixture of aggregates and water shall be between 50° F and 85° F before introduction of the cement.
    d. All concrete shall be effectively protected as follows:
        1) Slab Concrete
            a) The temperature of all unformed surfaces shall be maintained at 50° F or above for a period of 72 hours from time of placement and above 40° F for an additional 72 hours.
        2) Piers, Culverts walls, Retaining walls, Parapets, Wing walls, Bottoms of Slabs, and Other Similar Formed Concrete
            a) The temperature at the surface of all concrete shall be maintained at 40° F or above for a period of 72 hours from time of placement.
            b) The temperature of all concrete, including the bottom slabs of culverts placed on or in the ground, shall be maintained above 50° F for a period of 72 hours from time of placement.
        3) Protection shall consist of providing additional covering, insulated forms or other means, and if necessary, supplementing such covering with artificial heating.
        4) Curing as specified in Section 03 39 11 CONCRETE CURING shall be provided during this period until all requirements for curing have been satisfied.

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5) When impending weather conditions indicate the possibility of the need for such temperature protection, all necessary heating and covering material shall be on hand ready for use before placement.
6) Sufficient extra test specimen will be made and cured with the placement to ascertain the condition of the concrete as placed prior to form removal and acceptance.

3. Precast Concrete
   a. A fabricating Plant for precast products which has adequate protection from cold weather in the form of permanent or portable framework and covering, which protects the concrete when placed in the forms, and is equipped with approved steam curing facilities, may place concrete under any low temperature conditions provided:
      1) The framework and covering are placed and heat is provided for the concrete and the forms within one (1) hour after the concrete is placed.
      2) This shall not be construed to be one (1) hour after the last concrete is placed, but that no concrete shall remain unprotected longer than one (1) hour.
      3) For fabricating Plants without the above facilities and for job site precast products, the requirements of Section 03 39 11 CONCRETE CURING will apply.

D. Placing Concrete in Hot Weather
   1. Extra care shall be taken to reduce the temperature of the concrete being placed and to prevent rapid drying of newly placed concrete.
   2. When the outdoor ambient temperature is more than 90°F, the temperature of the concrete as placed shall not exceed 90°F.
   3. When high temperatures, low humidity and dry winds create conditions suitable for plastic cracking, an evaporation retarder may be required to be applied by spray one or more times during the finishing operation.
   4. A fog spray shall be used during finishing operations.
   5. Curing shall be started as soon as the surface of the fresh concrete is sufficiently hard to permit it without damage.

E. Placing Concrete in Water
   1. Concrete shall be deposited in water only when specified on the Drawings or with written permission by the Owner.
      a. Its surface shall be kept approximately level during placement.
   2. The forms or cofferdams shall be sufficiently tight to prevent any water current passing through the space in which the concrete is being deposited.
   3. Pumping will not be permitted during the concrete placing, nor until it has set for at least thirty-six (36) hours.
   4. The concrete shall be placed with a tremie, closed bottom-dump bucket, or other approved method, and shall not be permitted to fall freely through the water nor shall it be disturbed after it has been placed.
      a. Tremie
         1) The tremie shall consist of a watertight tube fourteen inches (14”) or less in diameter.
         2) It shall be constructed so that the bottom can be sealed and opened after it is in place and fully charged with concrete.
         3) It shall be supported so that it can be easily moved horizontally to cover all the work area and vertically to control the concrete flow.
         4) The placing operations shall be continuous until the work is complete.
      b. Bottom-dump Buckets

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1) Bottom-dump buckets used for underwater placing shall have a capacity of not less than one-half cubic yard (1/2 cubic yard).
2) It shall be lowered gradually and carefully until it rests upon the concrete already placed and raised very slowly during the upward travel; the intent being to maintain still water at the point of discharge and to avoid agitating the mixture.
3) The placing operations shall be continuous until the work is complete.

F. Placing Concrete in Box Culverts
1. In general, construction joints will be permitted only where shown on the Drawings.
2. Where the top slab and walls are placed monolithically in culverts more than four-feet (4') in clear height, an interval of not less than one (1) nor more than two (2) hours shall elapse before placing the top slab to allow for shrinkage in the wall concrete.
3. The base slab shall be finished accurately at the proper time to provide a smooth uniform surface.
4. Top slabs which carry direct traffic shall be finished as specified for roadway slabs in Section 03 35 11 CONCRETE FINISHING.
5. Top slabs of fill type culverts shall be given a reasonable smooth float finish.

G. Placing Concrete in Foundations and Substructures
1. Concrete shall not be placed in footings until the depth and character of the foundation has been inspected by the Owner and permission has been given to proceed.
2. Placing of concrete footings upon seal courses will be permitted after the caissons or cofferdams are free from water and the seal course cleaned.
3. Any necessary pumping or bailing during the concreting operation shall be done from a suitable sump located outside the forms.
4. All temporary wales or braces inside cofferdams or caissons shall be constructed or adjusted as the work proceeds to prevent unauthorized construction joints in footings or shafts.
5. When footings can be placed in a dry excavation without the use of cofferdams or caissons, forms may be omitted, if desired by the Contractor and approved by the Owner, and the entire excavation filled with concrete to the elevation of the top of footing.
a. Note: Measurement for payment will be based on the footing dimensions as shown on the Drawings.

3.12 Epoxy

A. General Precaution
1. The Contractor is advised to become familiar with type of epoxy, method of application, and its basic limitations prior to using the epoxy.

B. Bond New Concrete to Existing Concrete
1. Surface Preparation
a. The existing concrete or structural surface to which the new concrete is to be bonded shall be roughened and cleaned.
b. The existing surface shall be made free from dust, laitance, grease, curing compounds, waxes and all foreign material.
c. Cleaning shall be done in strict accordance with manufacturer instructions.
1) Washing will not be allowed, unless authorized by Owner.
d. During application of bonding compound, surface may be dry, moist, or wet, but surface shall be free of standing water.
2. Proportioning and Mixing
a. The epoxy shall be mixed in accordance with the manufacturer's instructions.
b. The epoxy shall be used in a neat condition (without aggregate filler).
3. Application of Epoxy

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a. The epoxy-bonding compound shall be applied in strict accordance with manufacturer instructions.
b. Area adjacent to work shall be cleaned free of epoxy spills as to provide a neat appearance before work will be accepted.

C. Concrete Overlay
1. The concrete overlay shall be in accordance with the Drawings and this section.
2. The concrete overlay shall be applied over the epoxy within a period of time that shall not exceed sixty percent (60%) of the tack free time of the epoxy.
a. It is important for the Contractor to note that these times vary with the temperature and pot time.
b. The allowable times must be determined from the tack free times that are provided by the manufacturer.
3. If the allowable period of time is allowed to elapse before concrete overlay can be placed, another layer of epoxy shall be applied prior to placement of the concrete.

D. Epoxy Grout for patch to non-horizontal surfaces to concrete:
1. Surface Preparation
a. The existing concrete or structural surface to be bonded to shall be cleaned.
b. The existing surface shall be made free from dust, laitance, grease, curing compounds, waxes and all foreign material.
c. Cleaning shall be done in strict accordance with manufacturer instructions.
1) Washing will not be allowed, unless authorized by Owner.
d. During application of bonding compound, surface may be dry, moist, or wet, but surface shall be free of standing water, unless otherwise recommended by manufacturer
2. Proportioning and Mixing
a. The epoxy shall be mixed in accordance with the manufacturer instruction.
b. The epoxy may be mixed with dry masonry sand.
c. Sand shall conform to ASTM C-144 with 100% passing a No. 8 sieve and not more than 15% to 35% passing a No. 50 mesh sieve.
d. The amount of sand filler shall not exceed 3/4 to 1 (loose sand to epoxy by volume).
3. Application
a. Epoxy shall be applied in strict accordance with manufacturer instructions.
b. Area adjacent to work shall be cleaned free of epoxy spills as to provide a neat appearance before work will be accepted.

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SECTION 03 35 11
CONCRETE FINISHING

PART 1 - GENERAL
1.01 Description
A. This specification shall govern work required for the finishing of concrete as required to complete the project.
1.02 Related Sections
A. 03 31 11 CONCRETE STRUCTURES
1.03 References *The latest edition of the referenced item below shall be used.*
A. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 427, Surface Finishes for Concrete
B. American Concrete Institute
1.04 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related Sections.

PART 2 - PRODUCTS
2.01 General
A. All equipment, tools, and machinery used and performing any part of the work shall be maintained in such condition to insure completion of the work under way without excessive delays for repairs or replacements.
2.02 Screed
A. The screed shall be designed rigid enough to hold true to shape and shall have sufficient adjustments to provide for the required camber.
B. A vibrating screed may be used if heavy enough to prevent undue distortion.
C. The screed shall be provided with a metal edge.
2.03 Hand Operated Fogging Equipment
A. Shall be capable of producing a fine mist, not a spray.
B. Equipment shall pump water or water and air under high pressure through a suitable atomizing nozzle.
C. Shall be portable enough to use in the direction of any prevailing wind and adaptable for intermittent use to prevent excessive wetting of the concrete.

PART 3 - EXECUTION
3.01 General Information
A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.
B. When field conditions are such that additional moisture is needed for the final concrete surface finishing operation, the required water shall be applied to the surface by fog spray only, and shall be held to a minimum.
3.02 Treatment and Finishing of Horizontal Surfaces Except Roadway Slabs
A. All uniformed upper surfaces shall be struck off to grade and finished.
B. The use of mortar topping for surfaces under this classification will not be permitted.
C. After the concrete has been struck off, the surface shall be floated with a suitable float.
D. Sidewalks
   1. Shall be given a broom finish or may be stripped with a brush, as indicated on the Drawings or specified by the Owner.

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2. Finish shall be perpendicular to the centerline providing a slip resistant surface.

E. Other surfaces
1. Shall be float finished and stripped with a fine brush leaving a fine-grained texture.

3.03 Finish of Roadway Slabs

A. As soon as the concrete has been placed and vibrated in a section of sufficient width to permit working, the surface shall be approximately leveled, struck off and screed, carrying a slight excess of concrete ahead of the screed to insure filling of all low spots.

B. Screed
1. The surface of the concrete shall be screed a sufficient number of times and at such intervals to produce a uniform surface, true to grade and free of voids.
2. Longitudinal screeds shall be moved across the concrete with a saw-like motion while their ends rest on headers or templates set true to the roadway grade or on the adjacent finished slab.
3. If necessary, the screed surface shall be worked to smooth finish with a long handled wood or metal float of the proper size, or hand floated from bridges over the slab.

C. When required by the Owner, the Contractor shall perform sufficient checks with a long handled ten-foot (10') straightedge on the plastic concrete to insure that the final surface will be within the tolerances specified below.
1. The check shall be made with the straightedge parallel to the centerline.
2. Each pass thereof shall lap half of the preceding pass.
3. Ordinates of irregularities measured from the face of the straight-edge to the surface of the slab shall not exceed one-eighth of an inch (1/8") in depth shall be filled with fresh concrete and floated, making proper allowances for camber, vertical curvature and surface texture.
4. Occasional variations, not exceeding three-sixteenth of an inch (3/16") will be acceptable, if in the opinion of the Owner it will not affect the riding qualities.
5. The checking and floating shall be continued until the surface is true to grade and free of depressions, high spots, voids or rough spots.

D. Rail support holes shall be filled with concrete and finished to match the top of the slab.

E. Finish
1. Upon completion of the floating and/or straight edging and before the disappearance of the moisture sheen, the surface shall be given a finish as indicated within the Drawings or as directed by the Owner.
2. Should the texture depth fall below that intended, the finishing procedures shall be revised to produce the desired texture.

F. In all roadway slab finishing operations, camber for specified vertical curvature and transverse slopes shall be provided.

3.04 Finishing Exposed Surfaces

A. Concrete shall be finished as required for the respective items or as otherwise specified on the Drawings.

B. An ordinary surface finish shall be applied to all concrete surfaces either as a final finish or preparatory to a higher finish.

C. Ordinary Surface Finish shall be as follows:
1. After form removal, all porous or honeycombed areas and spalled areas shall be corrected by chipping away all loose or broken material to sound concrete.
2. Featheredges shall be eliminated by cutting a face perpendicular to the surface.
3. Shallow cavities shall be repaired using adhesive grout or epoxy grout.
4. If judged repairable by the Owner, large defective areas shall be corrected using concrete or other material approved by the Owner.
5. Holes and spalls caused by removal of metal ties, etc., shall be cleaned and filled with adhesive grout or epoxy grout.

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6. Exposed parts of metal chairs on surfaces to be finished by rubbing, shall be chipped out to a depth of one-half inch (1/2”) and the surface repaired.
7. All fines, runs, drips or mortar shall be removed from surfaces that remain exposed.
8. Form marks and chamfer edges shall be smoothed by grinding and/or dry rubbing.
9. Grease, oil, dirt, curing compound, etc., shall be removed from surfaces requiring a higher grade of finish.
10. Discolorations resulting from spillage or splashing of asphalt, paint or other similar material shall be removed.
11. Repairs shall be dense, well bonded and properly cured, and when made on surfaces that remain exposed and do not require a higher finish, shall be finished to blend with the surrounding concrete.

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SECTION 03 39 11
CONCRETE CURING

PART 1 - GENERAL

1.01 Description
A. This specification shall govern work required for the curing of concrete as required to complete the project.

1.02 elated Sections
A. 03 31 11 CONCRETE STRUCTURES

1.03 References *The latest edition of the referenced item below shall be used.*
A. American Concrete Institute (ACI) 318, **Building Code Requirements for Structural Concrete**
B. Texas Department of Transportation Departmental Material Specification DMS-4650, “Hydraulic Cement Concrete Curing Materials and Evaporation Retardants”
C. AASHTO Method T-26, "Standard Method of Test for Quality of Water to be used in Concrete"

1.04 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related Section(s).

PART 2 - PRODUCTS

2.01 Membrane Curing
A. Membrane curing materials shall comply with Texas Department of Transportation (TxDOT) Departmental Material Specification DMS-4650.
B. It shall be of such consistency that it can be satisfactorily applied as a fine mist through an atomizing nozzle by means of approved pressure spraying equipment at atmospheric temperatures above 40° Fahrenheit.
C. It shall be of such nature that it will not produce permanent discoloration of concrete surfaces nor react deleteriously with the concrete or its components.
D. Type 1 compound shall contain a fugitive dye that will be distinctly visible not less than four (4) hours nor more than seven (7) days after application.
E. The compound shall produce a firm, continuous, uniform moisture impermeable film free from pinholes and shall adhere satisfactorily to the surfaces of damp concrete.
F. It shall, when applied to the damp concrete surface, at the rate of coverage specified herein, dry to touch in not more than four (4) hours and shall adhere in a tenacious film without running off or appreciable sagging.
G. It shall not disintegrate, check, peel or crack during the required curing period.
H. The compound shall not peel or pick up under traffic and shall disappear from the surface of the concrete by gradual disintegration.
I. The compound shall be delivered to the job only in the manufacturer's original containers, which shall be clearly labeled with the manufacturer's name, the trade name of the material, and a batch number or symbol with which test samples may be correlated.
J. Percentage loss shall be defined as the water lost after the application of the curing material was applied.
K. The permissible percentage moisture loss (at the rate of coverage specified herein) shall not exceed the following:
   1. 24 hours after application.....2 percent (2%)
   2. 72 hours after application.....4 percent (4%)
L. Type 1 (Resin Base Only) curing compound will be permitted for slab concrete in bridge decks and top slabs of direct traffic culverts.

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2.02 Mat Curing

A. Wet Mat
   1. Shall be one (1) of the following:
      a. Cotton mats shall be used for this curing method.
      b. Damp burlap blankets made from nine-ounce stock

2.03 Water

A. Water for use in curing shall be free from oils, acids, organic matter or other deleterious substances and shall not contain more than 1000 parts per million of chlorides as CL nor than 1000 parts million of sulfates as SO_4.
B. Water from municipal supplies approved by the State Health Department will not require testing, but water from other sources will be sampled and tested before use.
C. Tests shall be made in accordance with AASHTO Method T-26, except where such methods are in conflict with provisions of this specification.
D. Seawater will not be permitted.
E. Water that stains or leaves an unsightly residue shall not be used.

PART 3 - EXECUTION

3.01 General Information

A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.
B. The Contractor shall inform the Owner fully of the methods and procedures proposed for curing; shall provide the proper equipment and material in adequate amounts, and shall have the proposed method, equipment and material approved prior to placing concrete.
C. Inadequate curing and/or facilities therefore shall be cause for the Owner to stop all construction on the job until remedial action is taken.

3.02 Curing Period

A. All concrete shall be cured for a period of seven (7) curing days except as noted below:

Table 1
Curing Days of Selected Concrete

Description	Required Curing
Top slabs of Direct Traffic	Fourteen (14) curing days (Type I or III cement)
Culverts	Ten (10) curing days (Type II cement)
Concrete Piling *(non-prestressed)*	Ten (10) curing days

B. When the air temperature is expected to drop below thirty-five (35) degrees Fahrenheit, the water curing mats shall be covered with polyethylene sheeting, burlap-polyethylene blankets or other material to provide the protection required by Article "Placing Concrete in Cold Weather" of these specifications.
C. A curing day is defined as a calendar day when the temperature, taken in the shade away from artificial heat, is above fifty (50) degrees Fahrenheit for at least nineteen (19) hours, (colder days if satisfactory provisions are made to maintain the temperature at all surfaces of the concrete above forty (40) degrees Fahrenheit for the entire twenty-four (24) hours).
D. The required curing period shall begin when all concrete therein has attained its initial set.

3.03 Curing Methods

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A. The following methods are permitted for curing concrete subject to the restrictions of Table 2 and the following requirements for each method of curing:
   1. Form Curing
      a. When forms are left in contact with the concrete, other curing methods will not be required except for cold weather protection.
   2. Water Curing
      a. General
         1) All exposed surfaces of the concrete shall be kept wet continuously for the required curing time.
      b. Wet Mat
         1) Mat curing of concrete is allowed where permitted by Table 2 in this specification or where otherwise approved by the Owner.
         2) They shall be placed as soon as possible after the surface has sufficiently hardened to prevent damage to the concrete.
         3) The mats shall be weighted down adequately to provide continuous contact with all concrete surfaces where possible.
         4) The surfaces of the concrete shall be kept wet for the required curing time.
         5) Surfaces which cannot be cured by contact shall be enclosed with mats, anchored positively to the forms, or to the ground, so that outside air cannot enter the enclosure.
         6) Sufficient moisture shall be provided inside the enclosure to keep all surfaces of the concrete wet.
      c. Water Spray
         a) This method shall consist of overlapping sprays or sprinklers that keeps all unformed surfaces continuously wet.
      d. Ponding
         1) This method requires the covering of the surfaces with a minimum of two-inches(2”) of approved clean granular sand material, kept wet at all times, or a minimum of one-inch depth of water.
         2) Satisfactory provisions shall be made to provide a dam to retain the water or saturated sand.
   3. Membrane Curing
      a. This consists of curing concrete pavement, concrete pavement (base), curbs, gutters, retards, sidewalk, driveways, medians, islands, concrete riprap, cement stabilized riprap, concrete structures and other concrete as indicated on the Drawings by impervious membrane method.
      b. Unless otherwise provided herein or shown on the Drawings, either Type 1 or Type 2 membrane curing compound may be used where permitted except that Type 1 (Resin Base Only) will be permitted for slab concrete in bridge decks and top of direct traffic culverts.
      c. Membrane curing shall be applied to dry surfaces, but shall be applied just after free moisture has disappeared.
      d. Formed surfaces and surfaces which have been given a first rub shall be dampened and shall be moist at the time of application of the membrane.
      e. When membrane is used for complete curing, the film shall remain unbroken for the minimum curing period specified.
      f. Membrane which is damaged shall be corrected immediately by reapplication of membrane.
      g. Unless otherwise noted herein or on the Drawings, the choice of membrane type shall be at the option of the Contractor.
      h. Only one (1) type of curing compound will be permitted on any one (1) structure.

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i. The membrane curing compound shall be applied after the surface finishing has been completed, and immediately after the free surface moisture has disappeared.
j. The surface shall be sealed with a single uniform coating of curing compound applied at the rate of coverage recommended by the manufacturer and directed by the Owner, but not less than one (1) gallon per 180 square feet of area.
k. The Contractor shall provide satisfactory means and facilities to properly control and check the rate of applications of the compound.
l. The compound shall be thoroughly agitated during its use and shall be applied by means of approved mechanical power pressure sprayers.
m. The sprayers used to apply the membrane to concrete pavement or concrete pavement (base) shall travel at uniform speed along the forms and be mechanically driven.
n. The equipment shall be of such design that it will insure uniform and even application of the membrane material.
o. The sprayers shall be equipped with satisfactory atomizing nozzles.
p. Only on small miscellaneous items will the Contractor be permitted to use hand-powered spray equipment.
q. For all spraying equipment, the Contractor shall provide facilities to prevent the loss of the compound between the nozzle and the concrete surface during the spraying operations.
r. The compounds shall not be applied to a dry surface and if the surface of the concrete has become dry, it shall be thoroughly moistened prior to application of membrane by fogging or mist application.
s. Sprinkling or coarse spraying will not be allowed.
t. At locations where the coating shows discontinuities, pinholes, or other defects; or if rain falls on the newly-coated surface before the film has dried sufficiently to resist damage, an additional coat of the compound shall be applied immediately at the same rate of coverage specified herein.
u. To insure proper coverage, the Owner shall inspect all treated areas after application of the compound for the period of time designated in the governing specification for curing, either for membrane curing or for other methods.
    1) Should the foregoing indicate that any area during the curing period is not protected, an additional coat or coats of the compound shall be applied immediately, and the rate of application of the membrane compound shall be increased until all areas are uniformly covered.
v. When temperatures are such as to warrant protection against freezing, curing by this method shall be supplemented with an approved insulating material capable of protecting the concrete for the specified curing period.
w. If at any time there is reason to believe that this method of curing is unsatisfactory or is detrimental to the work, the Contractor, when notified, shall immediately cease the use of this method and shall change to curing by one of the other methods specified under this contract.

B. The following methods are permitted for curing concrete subject to the restrictions of Table 2 and the following requirements for each method of curing:

Table 2
Curing Method

	REQUIRED		PERMITTED	
Structure Unit Description	Water for Curing	Membrane for	Water for Curing	Membrane for

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		Interim Curing		Interim Curing
Top slabs of direct traffic culverts	X	X		
Top surface of any concrete unit upon which concrete is to be placed and bonded at a later interval (Stub walls, risers, etc.)Other superstructure concrete (wing walls, parapet walls, etc.)	X			
Concrete pavement, curbs, gutters, retards, sidewalks, driveways, medians, islands, concrete structures, concrete riprap, etc.			X*	X*
All substructure concrete, culverts, box sewers, inlets, manholes, retaining walls			X*	X*

* Polyethylene sheeting, burlap polyethylene mats, or laminated mats to prevent outside air from entering will be considered equivalent to water or membrane curing.

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SECTION 04 20 00 – UNIT MASONRY

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

RELATED DOCUMENTS

A. Requirements of this section apply to masonry work specified in Division-04 section Reinforced Unit Masonry", Section 04 23 00.

CODES & SPECIFICATIONS

A. All concrete masonry construction shall conform to the requirements of the local building code and IBC 2015.

DESCRIPTION OF WORK

A. Extent of each type of masonry work is indicated on the architectural and structural drawings and in schedules. Provide all labor, materials, equipment, and services necessary for and incidental to the installation of all masonry construction as indicated on the drawings and specified herein.

B. Masonry construction includes non-reinforced brick, and reinforced and non-reinforced concrete masonry including concrete filled masonry beams. Accessories include, but are not necessarily limited to ties, horizontal and vertical reinforcement, anchors to the structure, and control joints.

C. The masonry contractor shall install all accessory items that are required in the work and supplied by others, including: bolts, nailing blocks, inserts, anchors, flashing, lintels, expansion joints, conduits, etc.

D. Types of masonry work required include:

1. Concrete unit masonry (CMU).
2. Brick masonry.
3. Cast Stone masonry.
4. Reinforcement, anchorage and accessories.

QUALITY ASSURANCE

A. Single Source Responsibility for Masonry Units:

1. Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

B. Single Source Responsibility for Mortar Materials:

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1. Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

SUBMITTALS

A. Product Data:

1. Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements. Provide certification of pull-out strength of all masonry ties and anchors. Submit certification of compliance with required standards for all masonry units. Submit one sample each of all masonry accessories items.

2. For each type of brick masonry work, furnish not less than five individual brick as samples, showing extreme variations in color and texture.

B. Samples for Initial Selection Purposes:

1. Submit samples of the following materials:

a. Unit masonry samples in small scale form showing full extent of colors and textures available for each type of exposed masonry unit required.
b. Colored masonry mortar samples showing full extent of colors available.

C. Samples for Verification Purposes:

1. Submit the following samples:

a. Unit masonry samples for each type of exposed masonry unit required; include in each set the full range of exposed color and texture to be expected in completed work.
b. Include size variation data verifying that actual range of sizes for brick falls within ASTM C 216 dimension tolerances for brick where modular dimensioning is indicated.

2. Provide minimum 3’-0” x 5’-0” sample of each brick type laid with selected mortar for final approval. Sample(s) shall remain on job site until completion of brick work.

D. Mix Designs:

1. Mix designs for mortar and grout specifying type, source, and brand of all materials shall be submitted for Engineer and Owner testing laboratory approval prior to start of the work. Mix designs shall be submitted only for structural load bearing walls and exterior walls subjected to wind load.

E. Results of Preconstruction Testing:

1. Test reports for each type of building and facing brick are to be submitted to the Architect/Engineer for approval.

2. Testing and reports are to be completed by an independent laboratory.

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3. Test reports shall show:

    a. Compressive strength
    b. 24-hr. cold water absorption
    c. 5-hr. boil absorption
    d. Saturation coefficient
    e. Initial rate of absorption (suction).

F. Certificates:

1. Prior to delivery, submit to Architect/Engineer certificates attesting compliance with the applicable specifications for grades, types or classes included in these specifications.

DELIVERY, STORAGE & HANDLING

A. Deliver masonry materials to project in undamaged condition.

B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.

C. Limit moisture absorption of concrete masonry units during delivery and until time of installation to the maximum percentage specified for Type I units for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.

D. Store cementitious materials and masonry units off the ground, under cover and in dry location. All materials must be protected from wetting by capillary action, rain, or snow, and protected from mud, dust, or other materials and contaminants likely to cause staining or defects.

E. Store aggregates where grading and other required characteristics can be maintained.

F. Store masonry accessories including metal items to prevent deterioration by corrosion or accumulation of dirt.

G. Store mortar materials on dunnage, in a dry place. During freezing weather, protect masonry units with tarpaulins or other suitable material.

H. Protect reinforcement and accessories from elements.

PROJECT CONDITIONS

A. Protection of Work:

1. The Contractor shall construct and maintain temporary protection as required to permit continuous progress of the work. During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.

    a. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

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b. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.
c. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.

PART 2 - PRODUCTS

BRICK MADE FROM CLAY OR SHALE

A. General:

1. Comply with referenced standards and other requirements indicated below applicable to each form of brick required.

B. Size:

1. Provide bricks manufactured to the following actual dimensions:

a. Standard Modular Size Brick: 2-1/4" x 3-5/8" x 7-5/8".

C. Special Shapes:

1. Provide special molded shapes where indicated and for application requiring brick of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing. The Contractor shall furnish all required sizes and shapes as required to complete the work.
2. For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored or unfrogged units with all exposed surfaces finished.

D. Facing Brick:

1. ASTM C 216, and as follows:

a. Grade SW.
b. Type FBS (normal size and color variations).
c. Compressive Strength:
(i) Average of five tests per ASTM C 67.
d. Application:
(i) Use where brick is exposed, unless otherwise indicated.
e. Texture and Color:
(i) Provide brick similar in color, texture, and physical properties to those at the existing Field House and Natatorium Buildings. Do not exceed variations in color and texture of samples accepted by the Architect.

E. Building (Common) Brick:

1. ASTM C 62 Grade SW, and as follows:

a. Application:
(i) Use where brick is indicated for concealed locations.

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CONCRETE MASONRY UNITS

A. Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.

B. Provide square-edged units for outside corners, except where indicated as Bullnose.

C. Provide units complying with characteristics indicated below for Grade, Type, face size, exposed face and, under each form of block included, for weight classification.

1. Grade N.

2. Size:

    a. Manufacturer's standard units with nominal face dimensions of 16" long x 8" high (15-5/8" x 7-5/8" actual) x thicknesses indicated unless shown otherwise on the drawings. The Contractor shall furnish all required sizes and shapes as required to complete the work.

3. Type I, moisture-controlled units. Cure units by autoclave treatment at a minimum temperature of 350°F (176°C) and a minimum pressure of 125 psi.

4. Exposed Faces:

    a. Manufacturer's standard color and texture, unless otherwise indicated.
        1) Where special finishes are indicated, provide units with exposed faces of the following general description matching color and texture of Architect's sample.
            (i) Standard aggregate, ground finish.
        2) Where special patterns are indicated, provide units with exposed faces matching color, texture and pattern of Architect's sample.

5. Hollow Loadbearing Block:

    a. ASTM C 90 lightweight.

6. Solid Loadbearing Block:

    a. ASTM C 145 lightweight.

7. Glazed Faced Concrete Masonry Units:

    a. Units shall be Spectra Glaze II pre-glazed concrete masonry units as manufactured by The Burns & Russell Company as noted on the drawings.

CAST STONE

A. General:

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1. Comply with referenced standards and other requirements indicated below applicable to each form of cast stone required. Provide cast stone as scheduled on the drawings.

B. Type:

1. Cast Stone:

a. Finish: Honed.
b. Color: Refer to Material Schedule.
c. Sizes: Profile, length and width as indicated on drawings.
d. Comply with ASTM C568.

MORTAR & GROUT MATERIALS

A. Portland Cement:

1. ASTM C 150, Type I, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.

B. Hydrated Lime:

1. ASTM C 207, Type S.

C. Quicklime:

1. ASTM C5.

D. Aggregate for Mortar:

1. ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.

a. White Mortar Aggregates: Natural white sand or ground white stone.

E. Coarse Aggregate for Grout:

1. ASTM C 404, maximum size 3/8".

F. Water:

1. Clean and potable. Mixing water must be free of harmful amounts of acids, alkalis, organic materials, or other substances that would adversely affect the quality or appearance of the mortar or the masonry units.

G. Proprietary Mortar Mixes:

1. Proprietary mortar mixes may not be used.

JOINT REINFORCEMENT, TIES & ANCHORING DEVICES

A. General:

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1. Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics:

2. Manufacturers:

   a. Subject to compliance with requirements, provide products of one of the following:
      (i) AA Wire Products Co.
      (ii) Dur-O-Wall, Inc.
      (iii) Hohmann & Barnard, Inc.
      (iv) National Wire Products Corp.
   b. Other manufacturers shall be used only with Engineer approval. The Contractor shall submit technical literature for all reinforcing units.

B. Hot-Dip Galvanized Steel Wire:

1. ASTM A 82 for uncoated wire and ASTM A 153, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication into units.

   a. Application: Use for masonry exposed to exterior and in contact with earth.

C. Zinc-Coated (Galvanized) Steel Sheet:

1. Carbon steel with zinc coating complying with ASTM A 525, Coating Designation G90.

   a. Application: Use for dovetail slots and where indicated.

D. Hot-Dip Galvanized Carbon Steel Sheet:

1. ASTM A 366, Class 2 or ASTM A 635; hot-dip galvanized after fabrication to comply with ASTM A 153, Class B.

   a. Application: Use for anchors.

E. Joint Reinforcement:

1. Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods in straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:

   a. Width: Fabricate joint reinforcement in units with widths a minimum of 2" less than nominal width of walls. Provide mortar coverage over joint reinforcement of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.

2. Wire Size for Side and Cross Rods:

   a. 0.1483" diameter (9 ga.) for all masonry construction except as noted below.
   b. 0.1875" diameter (6 ga.) for loadbearing or reinforced concrete masonry construction.

3. For single-wythe masonry provide type as follows with single pair of side rods:

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a. Ladder design with perpendicular cross rods spaced not more than 16" o.c.

F. Bent-Wire Ties:

1. Provide individual prefabricated bent-wire units complying with requirements indicated below:

a. Wire Size: 0.1875" diameter.
b. Length: Provide units of length indicated but not less than that required for embedment into each wythe of 2" for solid units and for a minimum of 2" embedment of tie end into face shells of hollow units, with not less than 5/8" mortar cover on exterior face joints, 1/2" elsewhere.
c. Tie Shape for Hollow Masonry Units Laid with Cells Vertical: Rectangular with ends welded closed and not less than 2" wide.
d. Tie Shape for Solid Masonry Unit Construction: Z-shaped ties with ends bent 90° to provide hooks not less than 2" long.
e. Type for Masonry where Coursing Between Wythes Align: Unit ties bent from onepiece of wire.
f. Type for Masonry where Coursing Between Wythes Does Not Align:
(i) Adjustable ties composed of two parts, one with a pintle, the other with an eye.

G. Flexible Anchors:

1. Where flexible anchors are indicated for connecting masonry to structural framework, provide 2-piece anchors as described below which permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to, plane of wall:

a. For anchorage to concrete framework, provide manufacturer's standard anchors with dovetail anchor section formed from 0.1046" (12 gage) thick sheet metal and triangular-shaped wire tie section sized to extend within 1" of masonry face.
b. For anchorage to steel framework provide manufacturer's standard anchors with crimped 1/4" diameter wire anchor section for welding to steel and triangular-shaped wire tie section sized to extend within 1" of masonry face.
c. Wire Size: 0.1875" diameter.

H. Masonry Veneer Anchors:

1. Provide individual prefabricated bent-wire units complying with requirements indicated below:

a. Wire Size: 0.1875" diameter.
b. Length: Provide units of length indicated but not less than that required for embedment into each wythe of 2" for solid units and for a minimum of 2" embedment of tie end into face shells of hollow units, with not less than 5/8" mortar cover on exterior face joints, 1/2" elsewhere.
c. Tie Shape for Brick Veneer to CMU backup: Z-shaped ties with ends bent 90° to provide hooks not less than 2" long.

I. Rigid Anchors:

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1. Provide straps of form and length indicated, fabricated from sheet metal strips of following width and thickness, unless otherwise indicated. Typical length to be 24" plus 2" long, 90° bends at ends.

    a. Width: 1-1/4"
    b. Thickness: 1/4"

J. Unit Type Masonry Inserts in Concrete:

1. Furnish cast iron or malleable iron inserts of type and size indicated.

K. Dovetail Slots:

1. Furnish dovetail slots, with filler strips, of slot size indicated, fabricated from 0.0336" (22 gage) sheet metal.

L. Anchor Bolts:

1. Provide steel bolts with hex nuts and flat washers complying with ASTM A 307, Grade A, hot-dip galvanized to comply with ASTM C 153, Class C, in sizes and configurations indicated.

CONCEALED FLASHING MATERIALS

A. Sheet Metal Flashing:

1. Fabricate from the following metal complying with requirements specified in Section 07552 - Modified Bitumen Membrane Roofing and below:

    a. Stainless Steel: 0.015" thick.

2. Fabricate through-wall metal flashings with deformation in both directions for integral mechanical mortar bond.

B. Membrane Flashing:

1. Refer to Section 071000 – Waterproofing & Dampproofing.

MISCELLANEOUS MASONRY ACCESSORIES

A. Weepholes:

Louvered or Honycomb polypropylene design toallow passage of moisture from cavity to the building. Size vents to fit head joints of brick or block being used.
1. Basis of Design: QV - Quadro-Vent by Hohmann and Barnard, Inc.
2. Color: Grey where uncolored mortar is used. As selected by Architect from manufacturer's full line of colors when colored mortar is used.

B. Cavity Drainage Material:

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High density polyehtylene strands woven into a 90% open mesh that breaks up mortar droppings and prohibits mortar from creating a moiture retianing barrier, allowing water to flow freely to the weep holes.

1. Basis of Design: Mortar Trap by Hohmann and Barnard, Inc.

C. Bond Breaker Strips:

Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No.15 asphalt felt).

MASONRY CLEANERS & SEALERS

A. Job-Mixed Detergent Cleaning Solution:

1. Solution of trisodium phosphate (1/2 cup dry measure) and laundry detergent (1/2 cup dry measure) dissolved in one gallon of water.

B. Brick Sealer and Cast Stone Sealer:

1. Sonneborn White Roc 10 Plus water-repellent.

2. Furnish a five (5) year written performance guarantee from Sonneborn for the White Roc 10 Plus water-repellent.

MORTAR & GROUT MIXES

A. General:

1. Do not add admixtures including coloring pigments, air-entraining agent, accelerators, retarders, water repellant agent, anti-freeze compounds or other admixtures.

2. Do not use calcium chloride in mortar or grout.

B. Mortar for Unit Masonry:

1. Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated. Minimum twenty-eight day compressive strength shall be 1800 psi.

a. Limit cementitious materials in mortar to portland cement-lime.
b. Use Type S mortar for reinforced masonry unless noted otherwise.

C. Colored Pigmented Mortar:

1. Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment-to-cement ration of 1-to-10, by weight.

D. Grout for Unit Masonry:

1. Comply with ASTM C 476 for grout for use in construction of reinforced and non-reinforced unit masonry. Use grout of consistency indicated or if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces

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intended to receive grout. Minimum twenty-eight day compressive strength shall be 2000 psi.

2. Use fine grout in grout spaces less than 2" in horizontal direction, unless otherwise indicated. Fine grout shall be composed of one part portland cement, to which may be added not more than one-tenth part hydrated lime or lime putty, and two and one-fourth to three parts sand.

3. Use coarse grout in grout spaces 2" or more in least horizontal dimension, unless otherwise indicated. Coarse grout shall be composed of one part portland cement to which may be added not more than one-tenth part hydrated lime or lime putty, and two to three parts sand, and not more than two parts gravel.

4. Satisfy all local codes for maximum aggregate size with respect to minimum clear opening to be grouted.

PART 3 - EXECUTION

INSTALLATION - GENERAL

A. Inspect surfaces that are to support masonry work to assure completion to proper lines and grades free of dirt and other deleterious material. Do not begin work until surfaces not properly prepared have been satisfactorily corrected.

B. Wetting Clay Brick:

1. Wet brick made from clay or shale which have ASTM C 76 initial rates of absorption (suction) of more than 20 grams for 30 sq. in. per minute. Use wetting methods which ensure each clay masonry unit being nearly saturated with clean water 24 hours prior to placement but surface dry when laid.

   a. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements:
      (i) For units with surface temperatures above 32°F (0°C), wet with water heated to above 70°F (21°C).
      (ii) For units with surface temperatures below 32°F (0°C), wet with water heated to above 130°F (54°C).
      (iii) During freezing weather, units that require wetting shall be sprinkled with warm or hot water just before laying.

2. Do not wet concrete masonry units.

C. Cleaning Reinforcing:

1. Before placing, remove loose rust, ice and other coatings from reinforcing.

D. Thickness:

1. Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.

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2. Build chases and recesses as shown or required for the work of other trades. Provide not less than 8" of masonry between chase of recess and jamb of openings, and between adjacent chases and recesses.

3. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.

E. Cutting masonry units:

1. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous patterns and to fit adjoining work. Use full-size units without cutting where possible.

2. Use dry cutting saws to cut concrete masonry units.

F. Do not install cracked, broken, or chipped masonry units exceeding ASTM allowances.

G. Protect sills, ledges, and offsets from mortar droppings or other damage during construction. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface. Remove misplaced mortar or grout immediately. Protect face materials against staining. Protect door jambs and corners from damage during construction.

H. Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Immediately remove grout or mortar in contact with such masonry.

I. Mixing Mortar and Grout:

1. Combine and thoroughly mix cementitious material and aggregate for a minimum of five (5) minutes in a mechanical batch mixer. Add water in amounts required for workability. If mortar begins to stiffen from evaporation or absorption of a part of mixing water, retemper by adding water and remix. Grout shall have a slump of ten and one-half (10 1/2) to eleven (11) inches at time of placement. Mortar and grout shall be used within two and one-half (2 1/2) hours of initial mixing and no mortar or grout shall be used after it has begun to set.

COLD WEATHER CONSTRUCTION

A. Surface Conditions:

1. Ice or snow that has formed on the masonry bed shall be thawed by application of heat. Apply heat carefully until top surface is dry to the touch. Any section of completed masonry work that is deemed frozen and damaged shall be removed before continuing construction of that section.

B. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night

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temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10°F (6°C).

1. 40°F (4°C) to 32°F (0°C):

    a. Mortar: Heat mixing water to produce mortar temperature between 40°F (4°C) and 120°F (49°C).

    b. Grout: Follow normal masonry procedures.

2. 32°F (0°C) to 25°F (-4°C):

    a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C); maintain temperature of mortar on boards above freezing.
    b. Grout: Heat grout materials to 90°F (32°C) to produce in place grout temperature of 70°F (21°C) at end of work day.

3. 25°F (-4°C) to 20°F (-7°C):

    a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C); maintain temperature of mortar on boards above freezing.
    b. Grout: Heat grout materials to 90°F (32°C) to produce in place grout temperature of 70°F (21°C) at end of work day.
    c. Heat both sides of walls under construction using salamanders or other heat conventionally used and effective sources.
    d. Use windbreaks or enclosures when wind is in excess of 15 mph.

4. 20°F (-7°C) and below:

    a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40°F (4°C) and 120°F (49°C).
    b. Grout: Heat grout materials to 90°F (32°C) to produce in place grout temperature of 70°F (21°C) at end of work day.
    c. Masonry Units: Heat masonry units so that they are above 32°F (0°C) at time of laying.
    d. Provide enclosure and auxiliary heat to maintain an air temperature of at least 40°F (4°C) for 24 hours after laying units.

5. Do not heat water for mortar and grout to above 160°F (71°C).

C. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry, temperature ranges apply to anticipated minimum night temperatures.

1. 40°F (4°C) to 32°F (0°C): Protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

2. 32°F (0°C) to 25°F (-4°C): Completely cover masonry with weather-resistive membrane for at least 24 hours.

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3. 25°F (-4°C) to 20°F (-7°C): Completely cover masonry with weather-resistive insulating blankets or similar protection for at least 24 hours, 48 hours for grouted masonry.

4. 20°F (-7°C) and below: Except as otherwise indicated, maintain masonry temperature above 32°F (0°C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40°F (4°C) for 48 hours.

CONSTRUCTION TOLERANCES

A. Variation from Plumb:

1. For vertical lines and surfaces of columns, walls and arises do not exceed 1/4" in 10 feet, or 3/8" in a story height not to exceed 20 feet, nor 1/2" in 40 feet or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4" in any story or 20 feet maximum, nor 1/2" in 40 feet or more. For vertical alignment of head joints do not exceed plus or minus 1/4" in 10 feet, 1/2" maximum.

B. Variation from Level:

1. For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4" in any bay or 20 feet maximum, nor 1/2" in 40 feet or more. For top surface of bearing walls do not exceed 1/8" between adjacent floor elements in 10 feet or 1/16" within width of a single unit.

C. Variation of Linear Building Line:

1. For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2" in any bay or 20 feet maximum, nor 3/4" in 40 feet or more.

D. Variation in Cross-Sectional Dimensions:

1. For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4" nor plus 1/2".

E. Variation in Mortar Joint Thickness:

1. Do not exceed bed joint thickness indicated by more than plus or minus 1/8", with a maximum thickness limited to 1/2". Do not exceed head joint thickness indicated by more than plus or minus 1/8".

LAYING MASONRY WALLS

A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.

B. Lay-up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other work.

C. Pattern Bond:

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1. Lay exposed masonry in the bond pattern shown or, if not shown, lay in 1/2 running bond with vertical joint in each course centered on units in courses above and below. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2". Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4" horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work:

1. Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces at set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.

E. Built-in Work:

1. Install bolts, anchors, nailing blocks, inserts, frames, vent flashings, conduit, and other built-in items specified under this and other sections of these specifications as masonry work progresses. Avoid cutting and patching. Solidly grout spaces around built-in items. Provide joints around exterior framed openings 1/4" to 3/8" wide, raked and tooled smooth to a uniform depth of 3/4", ready for caulking by others. Build chases, do not cut. Consult other trades in advance and makeprovisions for installation of their work to avoid cutting and patching. Install chases minimum of one full masonry unit length from jambs.

   a. Fill in space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
   b. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core, unless detailed otherwise.
   c. Fill cores in hollow concrete masonry units with grout to supporting beam or slab below under bearing plates, beams, lintels, posts and similar items, unless otherwise indicated.

F. Bondbreaker Strips at Corners:

1. Unless shown otherwise, provide bondbreaker strips between concrete foundation and first masonry course for a length of 3 feet each direction from all corners.

MORTAR BEDDING & JOINTING

A. Provide uniform nominal joint thickness as shown below, unless noted otherwise on the drawings:

1. Concrete Masonry Units & Brick, 3/8".

B. Lay solid brick size masonry units and hollow CMU with cells grouted with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not furrow bed joints. Do not slush head joints.

C. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells of cavities to be reinforced or filled with concrete or

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grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

D. Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints.

E. Provide weather-proof, concave, tooled joints in exposed surfaces when mortar is thumbprint hard, using round jointing tool. Strike joints flush in surfaces to be plastered, stuccoed, or covered with other material or surface-applied finish other than paint. Concave tool exterior joints below grade. Remove mortar protruding into cells or cavities to be grouted. Do not permit mortar droppings to fall into cavities of multi-wythe walls or to block weep holes. Do not fill horizontal joints between top of masonry partitions and underside of concrete or steel construction with mortar unless specifically shown on the drawings. If not shown otherwise, provide 1" clear joint to be filled with caulk. Keep movement joints clean of all mortar and debris. For tuckpointing, rake mortar joints to a depth of 1/2 to 3/4 in., saturate with clean water, fill solidly with pointing mortar, and tool to match existing joints.

F. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners of jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

G. Collar Joints:

1. After each course is laid, fill the vertical longitudinal joint between wythes solidly with mortar (grout if walls are grouted) for the following masonry work:

a. Exterior walls, except cavity walls.

STRUCTURAL BONDING OF MULTI-WYTHE MASONRY

A. Where horizontal joints in adjacent wythes do not align use individual metal ties installed in horizontal joints to bond wythes together. Provide ties as shown, but not less than one metal tie for 2.0 square feet of wall and spaced not to exceed 24" o.c. horizontally or vertically. Stagger ties in alternate courses. Provide additional ties within 1'-0" of all openings and space not more than 3'-0" apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24" o.c. vertically.
MAX. TIE SPACING

VERT.	HORIZ.
24"	16"

B. Bed joints of opposing wythes shall not be farther apart vertically than 1 1/2" either direction. Ties shall be sized to extend a minimum of 2" into the joints.

C. Where horizontal joints of adjacent wythes align, use continuous horizontal joint reinforcement installed in horizontal mortar joints for bond tie between wythes. Install at not more than 16" o.c. vertically.

D. Corners:

Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.

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1. For horizontally reinforced masonry, provide continuity at corners with prefabricated "L" units, in addition to masonry bonding.

E. Intersecting and Abutting Walls:

Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:

1. Provide individual metal ties at not more than 24" o.c. vertically.

2. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.

F. Non-bearing Interior Partitions:

Build full height of story to underside of solid floor or roof structure above, unless otherwise shown.

CAVITY WALLS

A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity flush.

B. Where horizontal joints of adjacent wythes align, tie exterior wythe to back-up with continuous horizontal joint reinforcing, installed in mortar joints at not more than 16" o.c. vertically.

C. Where horizontal joints of adjacent wythes do not align, tie exterior wythe to back-up with individual metal ties spaced not more than 24" o.c. vertically and 16" o.c. horizontally. Stagger courses with joint reinforcing.

D. Provide weep holes in head joints in first course immediately above all flashing. Leave head joint free and clean of mortar. Space weep holes 24" on center maximum for brick masonry, and 32" on center maximum for concrete unit masonry. Keep weep holes and area above flashing free of mortar droppings.

HORIZONTAL JOINT REINFORCEMENT

A. General:

1. Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6" at splices.

2. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

3. Reinforce walls with continuous horizontal joint reinforcing unless specifically noted to be omitted.

4. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

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5. Space continuous horizontal reinforcement as follows:

    a. For multi-wythe walls (solid or cavity) space horizontal reinforcement 8" o.c. vertically for first two courses then 16" o.c. vertically.
    b. For single-wythe walls space horizontal reinforcement 8" o.c. vertically for first two courses then 16" o.c. vertically.
    c. For parapets, space reinforcement at 8" o.c. vertically, unless otherwise indicated.
    d. For perforated masonry screen walls, space reinforcement at 12" o.c. vertically, unless otherwise indicated.
    e. For concrete masonry cantilever walls and fences, space reinforcement at 8" o.c. vertically, unless otherwise indicated.

6. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in two horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints. Horizontal joint reinforcement interrupted by the jamb of an opening shall have the cross rod or side rod bent and hooked at the jamb. Provide an additional rectangular adjustable tie at the jamb for each joint not containing the normal horizontal reinforcing unit.

7. Provide reinforcement at openings in addition to other specified wall reinforcement.

ANCHORING MASONRY VENEER

A. General:

    1. Provide anchor devices of type indicated.

B. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following, unless noted otherwise on the drawings:

    1. Provide an open space not less than 1" in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.

    2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.

    3. Space anchors as indicated, but not more than 24" o.c. vertically and 16" o.c. horizontally.

C. Where wire ties are welded to structural members, paint welded area with Z.R.C. Cold Galvanizing Compound after welding.

D. Brick Soffits:

    1. Place brick, face down, in strip grid system of form face. After bricks are positioned, fill joints with high bond mortar. Install Z-ties as detailed.

E. Anchor single wythe masonry veneer to CMU back up walls with adjustable masonry veneer anchors to comply with the following requirements:

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1. Install ladder or truss type horizontal joint reinforcing in the CMU wall. Locate joint reinforcement in the first bed joint and at 16" centers vertically above that.

2. Tie masonry veneer to CMU wall with rigid Z wire ties as specified. Provide one wall tie for each 2.66 square feet of wall area.

3. Maximum spacing shall be 24" vertically and 16" horizontally.

4. Place wall ties in alternate courses from CMU wall horizontal reinforcing.

5. Bed joints of opposing wythes with ties shall not be farther apart vertically than 1 1/2" either direction.

6. Ties shall extend a minimum of 2" into brick and CMU joints.

GROUTING

A. Where detailed, grout in reinforced masonry walls, columns, and pilasters as specified below. Fully grout vertical cells of concrete masonry containing steel reinforcement. Wherever possible, grouting shall be done from inside face of masonry. Exercise extreme care to prevent grout from staining face of masonry. Immediately remove any spilled grout from face and top of masonry.

CONTROL & EXPANSION JOINTS

A. General:

1. Provide vertical and horizontal expansion, control and isolation joints in masonry where shown. Build-in related items as the masonry work progresses.

B. Where control joints are not indicated on the drawings the Contractor shall submit a proposed control joint layout for Architect and Engineer approval. General guidelines for control joint locations are as follows:

1. At major changes in wall height

2. At changes in wall thickness

3. At corresponding control joints in foundations, floor, or roof construction

4. At one or both sides of wall openings (masonry veneer only)

5. Near wall intersections

6. At column centerlines.

C. Maximum Spacing:

Maximum control joint spacing shall be as follows:

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1. Non-Reinforced Masonry. Ratio of wall length to height shall not exceed 3 with maximum spacing of fifty feet.

2. Reinforced Masonry. Ratio of wall length to height shall not exceed 4 with a maximum spacing of 100 feet.

D. Build-in non-metallic joint fillers where indicated.

E. Provide continuous bond break at steel columns and members.

F. Provide pressure-relieving joints by adhering a continuous 3/8" thick neoprene pad below shelf angles supporting masonry veneer.

G. Leave joints around outside perimeters of exterior doors, window frames and other wall openings:

1. Depth: Uniform 3/4 in. (19mm).

2. Width: 1/4 in. (6.4 mm) to 3/8 in. (9.5mm).

LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and wherever openings of more than 1'-0" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Cure precast lintels before handling and installation. Temporarily support formed-in-place lintels until grout is properly cured.

1. For hollow concrete masonry unit walls, use specially formed U-shaped lintel units with reinforcement bars placed as shown filled with coarse grout.

C. Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

FORMS & SHORES

A. Provide forms and shores sufficiently strong and rigid as required to support brick soffits, beams, and lintels during construction.

B. Build forms to conform to shape, line, and dimension of masonry members as detailed, substantial and sufficiently tight to prevent leakage of mortar, grout or concrete. Properly brace or tie together so as to maintain position and shape.

C. Provide joint strips on form face of soffit forms at each brick joint.

FLASHING OF MASONRY WORK

A. Refer to Section 07 52 16 - Membrane Roofing & Sheetmetal and Section 071000 – Waterproofing & Dampproofing.

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INSTALLATION OF REINFORCED UNIT MASONRY

A. Refer to Section 04 20 00.13 "Reinforced Unit Masonry" for installation requirements applicable to reinforced unit masonry.

FIELD QUALITY CONTROL

A. Owner will employ separate testing laboratory to perform field quality control testing.

B. Prism Test Method:

1. Compression Test: For each type of wall construction indicated for testing, test representative masonry prisms by methods of sampling and testing of ASTM E 447, Method B, and as follows:

   a. Prepare one set of three prisms for testing at 7 days and one set of three prisms for testing at 28 days.
   b. For brick and concrete masonry prisms adhere to requirements as specified under preconstruction testing. Build prisms on job using same materials and methods as for wall construction. Store prisms in air at temperature not less than 65°F in a place where they will be undisturbed for seven (7) days. After seven (7) days, transport to laboratory in a manner which will not disturb mortar bond.
   c. Cap each prism with suitable material to provide bearing surfaces on each end.
      (i) Plane within 0.003 inch
      (ii) Approximately perpendicular to the axis of the prism.
   d. Conduct tests no less frequently than that required to provide sets of prisms from each 5000 square feet of wall area installed but not less than three such tests for any building.

2. Report test results in writing and in form specified under each test method, to Architect and Contractor, on same day tests are made.

3. Evaluation of Quality Control Tests: Masonry work, in absence of other indications of noncompliance with requirements, will be considered satisfactory if results from construction quality control tests comply with minimum requirements indicated.

4. Retests: Where prism tests indicate non-compliance with specified requirements, additional testing shall be performed at the frequency of two additional tests for each unsatisfactory test. The cost of all such additional testing shall be the responsibility of the Contractor. Where retesting fails to indicate conformance with specified requirements, any masonry construction represented by unsatisfactory tests shall be removed and replaced with acceptable masonry construction.

PARGING

A. Parge walls where indicated with Type S or N mortar, in thickness indicated.

   Thickness: Not less than 1/2".

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B. Trowel finish to a smooth, dense surface. Form a wash at top of parging and a cove at bottom. Where parging is applied in 2 coats, roughen first coat when partially set, let harden for 24 hours and moisten prior to application of second coat.
C. Damp cure parging for at least 24 hours and protect until cured.

REPAIR, POINTING, CLEANING & SEALING

A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing:

1. During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Pointup all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants. If the repairs must be made after the mortar has hardened, the joint must be raked or chiseled out to a depth of about 1/2" thoroughly wetted, and repointed with fresh mortar.

2. To pre-hydrate mortars, thoroughly mix all ingredients except water in proportions used for original mortar mix; then mix again, adding only enough water to produce a damp unworkable mix which will retain its form when pressed into a ball. After 1 to 2 hours, add sufficient water to bring it to the proper consistence; that is conventional masonry mortars.

C. Final Cleaning:

1. After mortar is thoroughly set and cured, clean masonry as follows:

a. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
b. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
c. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.
d. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clean water.
e. Use bucket and brush hand cleaning method described in BIA "Technical Note No. 20 Revised" to clean brick masonry made from clay or shale, except use masonry detergent cleaner.
f. Remove efflorescence in accordance with brick manufacturer's recommendations and as approved by Architect.
g. Clean concrete unit masonry to comply with masonry manufacturer's directions and applicable NCMA "Tek" bulletins.

D. Sealing Brick:

1. After brick wall is thoroughly cleaned and dry seal as follows:

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a. Apply Sonneborn White Roc 10 Plus water-repellent in strict accordance with manufacturer's written instructions and recommendations for the particular substrate involved
b. Avoid overspray on to adjacent building components and wall surfaces.

E. Protection and Cleanup:

1. Provide final protection and maintain conditions in a manner acceptable to Installer, which ensure unit masonry work being without damage and deterioration at time of substantial completion.

2. Leave work area and surrounding surfaces clean and free of mortar spots, droppings, and broken masonry.

END OF SECTION 04 20 00

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SECTION 04 23 00 - REINFORCED UNIT MASONRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Requirements of Section "Unit Masonry" apply to work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of each type of reinforced unit masonry work is indicated on drawings and in schedules. Provide all labor, materials, equipment, and services necessary for and incidental to the installation of all reinforced masonry construction as indicated on the drawings and specified herein. Reinforced unit masonry construction includes reinforced concrete masonry including concrete filled masonry beams, columns, pilasters, lintels, and soffits. Accessories include, but are not necessarily limited to ties, horizontal and vertical reinforcement, anchors to the structure, and control joints.

1.03 SUBMITTALS

A. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of reinforcement bars and for steel templates for layout of dowels for columns and pilasters. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Refer to Section "Unit Masonry" for masonry materials and accessories not included in this section.

B. Reinforcement Bars: Provide deformed bars of following grades complying with ASTM A 615, except as otherwise indicated.

1. Provide Grade 60 for No. 3 bars, except as otherwise indicated.

2. Provide Grade 60 for bars No. 4 to No. 11, except as otherwise indicated.

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3. Where No. 2 bars are shown, provide plain, round, carbon steel bars, ASTM A 675, Grade 80.

4. Shop fabricate reinforcement bars which are shown to be bent or hooked.

PART 3 - EXECUTION

3.01 GENERAL

Refer to Section "Unit Masonry" for general installation requirements of unit masonry.

3.02 PLACING REINFORCEMENT

A. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes.

B. Position reinforcement accurately at the spacing indicated. Support and secure vertical bars against displacement. Vertical bars shall be held in position at the top and bottom and at intervals not exceeding 8'-0" with a minimum clearance of 1/4" from the face of the masonry and not less than one bar diameter or 1" (whichever is greater) between adjacent bars.

C. For columns and pilasters, provide a clear distance between vertical bars as indicated, but not less than 1-1/2 times the nominal bar diameter or 1-1/2", whichever is greater. Provide lateral ties as indicated.

D. All dowels shall be grouted into a cell even if the dowel is in an adjacent cell to the vertical steel. Unless detailed otherwise on the drawings, dowels shall be the same size and number as the vertical steel. Unless noted otherwise provide a lap length of dowels to vertical reinforcement equal to 50 times the nominal dowel diameter. Dowels for columns and pilasters shall be set using 1/8" thick steel plate templates. Templates shall be detailed and submitted with reinforcing steel shop drawings.

E. All horizontal reinforcing steel shall be placed in continuous bond beam or lintel block units and shall be solidly grouted in place. Maintain a minimum of one bar diameter or 1" (whichever is greater) clearance between adjacent bars and a minimum of 1/4" clearance from the face of the masonry. Horizontal reinforcement may be placed as the masonry work progresses.

F. Splice reinforcement bars where shown; do not splice at other points unless acceptable to the Engineer. Where splices occur, adjacent splices shall be staggered so that no more than 25% of the total number of bars are spliced at any one point with a minimum stagger between splices in adjacent bars of at least the lap length. Provide lapped splices, unless otherwise indicated. In splicing vertical

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bars or attaching to dowels, lap ends, place in contact and wire tie. Minimum lap splice length shall be 52 bar diameters unless indicated otherwise.

G. Where reinforcement is prefabricated into cage units before placing, fabricate units with vertical reinforcement bars and lateral ties of the size and spacing indicated.

3.03 FORMWORK

A. Temporary Formwork: Provide formwork and shores as required for temporary support of reinforced masonry elements.

B. Construct formwork to conform to shape, line and dimensions shown. Make sufficiently tight to prevent leakage of mortar, grout, or concrete (if any). Brace, tie and support as required to maintain position and shape during construction and curing of reinforced masonry.

C. Formwork shall be designed and shop drawings prepared by a registered professional engineer in the state where the project is located.

D. Formwork shall not be removed until the reinforced masonry member has cured sufficiently to carry its own weight and any other loads that may be placed on it during construction. Allow not less than the following minimum time to elapse after completion of the member before removing shores or forms provided adequate curing conditions have been obtained during the curing period:

1. Lintels and beams - 10 days.

2. Reinforced masonry soffits - 7 days.

3. Allow 16 hours to elapse after completion of masonry columns and walls before placing floor or roof construction loads. Allow an additional 48 hours before applying concentrated loads such as girders, beams, or trusses.

3.04 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY

A. General:

1. Do not wet concrete masonry units (CMU).

2. Lay CMU units with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of longitudinal face shells. Solidly bed cross-webs of starting courses in mortar. Maintain head and bed joint widths shown, or if not shown, provide 3/8" joints.

B. Walls:

1. Pattern Bond: Lay CMU wall units in 1/2 running bond with vertical joints in each course centered on units in courses above and below, unless otherwise

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indicated. Bond and interlock each course at corners and intersections. Use special shaped units where shown, and as required for corners, jambs, sash, control joints, lintels, bond beams and other special conditions.

2. Maintain vertical continuity of core or cell cavities which are to be reinforced and grouted to provide minimum clear dimensions indicated and to provide minimum clearance and grout coverage for vertical reinforcing bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.

3. Provide #4 at 48" on center horizontal reinforcing in addition to joint reinforcing specified. Use special units or modify regular units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells of non-reinforced vertical cells, or provide units with solid bottoms.

C. Columns and Pilasters:

1. Use CMU units of the size, shape and number of vertical core spaces shown. If not shown, use units which provide minimum clearances and grout coverage for number and size of vertical reinforcement bars shown.

2. Provide pattern bond shown, or if not shown, alternate head joints in vertical alignment.

3. Where bonded pilaster construction is shown, lay wall and pilaster units together to maximum pour height specified.

D. Grouting:

1. General

a. Use "Fine Grout" per ASTM C 476 for filling spaces less than 4" in one or both horizontal directions. (2,000 psi)
b. Use "Coarse Grout" per ASTM C 476 for filling 4" spaces or larger in both horizontal directions. (2,000 psi)
c. Use 3000 PSI normal-weight concrete for filling spaces 10" and larger in both directions.
d. Grouting Technique: At the Contractor's option, use either low-lift or high-lift grouting techniques subject to requirements which follow.

2. Low-Lift Grouting:

a. Provide minimum clear dimension of 2" and clear area of 8 square inches in vertical cores to be grouted.
b. Place vertical reinforcement prior to laying of CMU. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 192 bar diameters nor 10 feet.

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c. Lay CMU to maximum pour height. Do not exceed 5 feet height, or if bond beam occurs below 5 feet height stop pour at course below bond beam.
d. Pour grout using chute or container with spout. Rod or vibrate grout during placing. Place grout continuously; do not interrupt pouring of grout for more than one hour. Terminate grout pours 1-1/2" below top course of pour.

e. Bond Beams: Stop grout in vertical cells 1-1/2" below bond beam course. Place horizontal reinforcement in bond beams; lap at corners and intersections as shown. Place grout in bond beam course before filling vertical cores above bond beam.

4. Preparation of Grout Spaces: Prior to grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry and other foreign materials from grout spaces. Clean reinforcement and adjust to proper position. Clean top surface of structural members supporting masonry to ensure bond. After final cleaning and inspection, close cleanout holes and brace closures to resist grout pressures.

5. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Install shores and bracing, if required, before starting grouting operations.

6. Place grout by pumping into grout spaces.

7. Place grout in lintels or beams over openings in one continuous pour.

8. Where bond beam occurs more than one course below top of pour, fill bond beam course to within 1" of vertically reinforced cavities, during construction of masonry.

9. When more than one pour is required to complete a given section of masonry, extend reinforcement beyond masonry as required for splicing. Pour grout to within 1-1/2" of top course of first pour. After grouted masonry is cured, lay masonry units and place reinforcement for second pour section before grouting. Repeat sequence if more pours are required.

E. Anchoring:

1. Anchor reinforced masonry work to supporting structure as indicated.
2. Anchor reinforced masonry walls to non-reinforced masonry where they intersect, unless shown otherwise.

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3.05 QUALITY CONTROL

A. Masonry Prisms shall be made and tested in accordance with Section "Unit Masonry".

B. Prism Strength

1. Compressive Strength, f'm. The compressive strength of reinforced concrete masonry, f'm, as determined by prism tests shall be as indicated below:

Class of Reinforced Masonry	28 Day Compressive Strength, f'm = 1500 PSI

C. Grout Tests

1. Grout shall be sampled and tested in accordance with ASTM C 1019 for every 1,000 square feet of masonry. Grout strength = 2,000 PSI minimum.

END OF SECTION 04 23 00

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SECTION 05 12 00 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of structural steel work is shown on drawings including schedules, notes and details which show size and location of members, typical connections, and type of steel required. Furnish all labor, materials, services, equipment and appliances required in conjunction with or related to the furnishing, fabrication, delivery, and erection of all structural steel defined below. Include all supplementary parts, members and connections necessary to complete the structural steel work, regardless of whether all such items are specifically shown or specified on the drawings.

B. Structural steel shall be defined as that work prescribed in Section 2.1 of the AISC Code of Standard Practice and the following items: angle frames for openings in roofs, miscellaneous metal deck support and edge angles, shop welded metal studs, all connection material, temporary construction bracing, and all other structural steel shown or specified on the drawings to be part of the work. Labor shall include shop painting as specified, field touch-up painting, and grouting of base plates and bearing plates.

C. Miscellaneous metal fabrications, architecturally exposed structural steel, metal stairs, steel joists, and metal deck are specified elsewhere in these Specifications.

1.3 QUALIFICATIONS

1. Fabricator: The structural steel fabricator shall have not less than 10 years experience in the successful fabrication of structural steel similar to this project. Evidence of compliance with this section shall be submitted to the Architect/Engineer.

2. Erector: The structural steel erector shall have not less than 5 years successful experience in the erection of structural steel of a similar nature to this project. Evidence of compliance with this section shall be submitted to the Architect/Engineer.

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1.4 QUALITY ASSURANCE

The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.

A. Codes and Standards:

Comply with provisions of the following, except as otherwise indicated:

1. All federal (OSHA), state and local laws which govern safety requirements for steel erection and other requirements if more stringent than the codes and standards enumerated below.

2. AISC "Code of Standard Practice for Steel Buildings and Bridges".

3. AISC "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings", including Commentary.

4. AISC "Specification for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation (Research Council on Structural Connections).

5. AWS D1.1 "Structural Welding Code - Steel".

6. "Steel Structures Painting Manual", Volumes 1 and 2, Steel Structures Painting Council.

B. Qualifications for Welding Work:

Qualify welding processes and welding operators in accordance with AWS "Structural Welding Code - Steel".

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

2. If recertification of welders is required, retesting will be Contractor's responsibility.

C. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in the mill, shop, and field by the Owner's testing laboratory. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements. The Contractor shall promptly remove and replace materials or fabricated components which do not comply.

D. Question about Contract Documents: The Contractor shall promptly notify the Architect/Engineer whenever design of members and connections for any portion of the structure are not clearly indicated or when other questions exist about the Contract Documents. Such questions shall be resolved prior to the submission of shop drawings.

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E. Testing Laboratory Services: See Structural Drawings required testing. Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.

1.5 SUBMITTALS

A. Shop Drawings:

1. General Requirements: Submit shop drawings including complete details and schedules for fabrication and assembly of structural steel members, and details, schedules, procedures and diagrams showing sequence of erection. Shop drawings not complying with the above requirements will not be reviewed. Structural steel shop drawings shall include the following minimum information:

a. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld. Holes, flange cuts, slots and openings shall be made as required by the structural drawings, all of which shall be properly located by means of templates.

2. The fabricator alone shall be responsible for all errors of detailing, fabrication, and for the correct fitting of the structural members.

3. All fabricated material and connections shall fit within architectural constraints.

4. Structural steel members for which shop drawings have not been reviewed and approved shall not be fabricated.

5. The omission from the shop drawings of any materials required by the Contract Documents shall not relieve the Contractor of the responsibility of furnishing and installing such materials, even though the shop drawings may have been reviewed and approved.

B. Test Reports: Submit copies of reports of tests conducted on all field-welded connections that are inspected. Include data on type(s) of tests conducted and test results.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time so as not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration. Do not

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store materials on structure in a manner that might exceed allowable loads on or cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed by Architect/Engineer.

D. Furnish all fuel, maintenance, and equipment required for hoisting and placement of materials under this contract.

E. Process, pay for and maintain all permits and certificates of on-site inspection required for derricks, cranes and hoisting equipment. No derrick, crane or hoisting equipment shall be operated without a certificate of operation and a certificate of on-site inspection, as required by governing authorities.

1. Wherever the erection equipment is supported by the structure, the Contractor shall be responsible for the retention of a licensed professional engineer to determine the adequacy of the member supporting the erection equipment in relation to the loads imposed thereon. The Contractor shall submit to the Architect/Engineer, for review, the loads which will be imposed by the erection equipment on the building structure. Where the imposed load exceeds the allowable stresses, the Contractor shall be responsible for any additional materials, supports, bracing, connections and similar measures required to support the imposed load of the equipment while in use, subject to review by the Architect/Engineer.

2. In addition to the above, all hoisting equipment shall be installed, operated and maintained in accordance with all applicable regulations of authorities having jurisdiction.

3. Street storage and sidewalk crossing permits shall be furnished by the Contractor.

1.7 JOB CONDITIONS

The Contractor shall coordinate the fabrication and erection of all structural steel work with the work of other trades. The contractor shall verify existing conditions prior to beginning work. The contractor shall verify all dimensions shown on the drawings with existing job conditions prior to beginning work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel: All hot rolled steel plates, shapes, sheet piling, and bars shall be new steel conforming to ASTM Specification A6 "Standard Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use". Structural steel shall comply with the provisions of the following ASTM Specifications as appropriate for the grades and types, and at the locations as specified on the drawings:

1. Structural Steel Shapes, Plates and Bars - Carbon Steel, ASTM A992 GR50 "Standard Specification for Structural Steel."

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2. Pipe Columns - ASTM A53 (Type E or S) Grade B, or ASTM A501.

3. Tube Sections - ASTM A500 Grade B. FY = 46 KSI

4. Connection Material: All connection material except as noted otherwise on the drawings including bearing plates, gusset plates, stiffener plates, filler plates, angles, etc. shall be A36 steel unless a higher or matching grade of steel with the members connected is required by strength or stiffness calculations and provided the resulting sizes are compatible with the members connected.

B. Structural Bolts and Threaded Fasteners: Structural bolts and threaded fasteners shall comply with the following ASTM Specifications as appropriate for the types and at the locations as specified on the drawings:

1. ASTM A307 Grade A, "Carbon Steel Externally Threaded Standard Fasteners".

2. ASTM A325 Type 1, "High-Strength Bolts for Structural Steel Joints".

3. Bolts and Nuts, High Strength Bolts: Bolts and nuts for all high strength bolts shall be heavy hex head conforming to ANSI Standards B18.2.1 and B18.2.2 respectively. Nuts shall conform to ASTM A563, "Standard Specification for Carbon and Alloy Steel Nuts".

4. Washers: All washers shall be circular, flat and smooth and shall conform to the requirements of Type A washers in ANSI Standard B23.1. Washers for high strength bolts shall be hardened and conform to ASTM F436, Specification for Hardened Steel Washers. Beveled washers for American Standard Beams and channels shall be square or rectangular, shall taper in thickness (16 2/3% slope) with an average thickness of 5/16". When an outer face of a bolted part has a slope greater than 1:20 with respect to a plane normal to the bolt axis, a beveled washer shall be used.

5. Bolt Lubrication: All bolts shall be well lubricated at time of installation. Dry, rusty bolts will not be allowed. Bolts or nuts shall be wax dipped by the bolt supplier or "Johnson's Stick Wax 140" shall be used with all bolts in the shop or field.
6. New Bolts: All bolts shall be new and shall not be reused.

C. Electrodes for Welding: Comply with AWS D1.1, "Structural Welding Code - Steel". Electrodes for various welding processes shall be as specified below:
1. SMAW: E70XX low hydrogen
2. SAW: F7X-EXXX
3. GMAW: ER70S-X
4. FCAW: E7XT-X
5. Weathering Steel Electrodes shall conform to Table 4.1.4 of the AWS D1.1 Manual.

Electrodes shall be compatible with parent metal joined.

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D. Structural Steel Primer Paint: Primer paint shall be one of the following types with the indicated surface preparation:

1. SSPC-Paint 1, 100% red lead and linseed oil, TT-P-86 Type I, surface prepared according to SSPC-SP-2 (Hand Tool Cleaning). All materials shall be lead and chromate free.

2. SSPC-Paint 2, red lead-iron oxide and oil-alkyd, surface prepared according to SSPC-SP-2 (Hand Tool Cleaning). All materials shall be lead and chromate free.

3. TT-P-86, Type II, red lead-iron oxide and oil-alkyd, surface prepared according to SSPC-SP-3 (Power Tool Cleaning). All materials shall be lead and chromate free.

4. TT-P-86, Type III, 100% red lead and alkyd varnish, surface prepared according to SSPC-SP-6 (Commercial Blast Cleaning) or SSPC-SP-8 (Pickling).

5. Alkyd Zinc Chromate Metal Primer 0239 Gray as manufactured by Devoe Napko (SSPL-SP6 Commercial Blast Cleaning).

6. Alkyd Fast Dry Primer 298 as manufactured by Porter Paints (SSPL-SP6 Commercial Blast Cleaning).

7. Modified Alkyd Rust Inhibitive Primer 4-56 as manufactured by Tnemec Company, Inc. (SSPL-SP6 Commercial Blast Cleaning).

Refer to Architect's drawings and specifications for final paint finish requirements of structural steel. Primer paint shall be compatible with final paint requirements.

2.2 FABRICATION

A. Shop Fabrication and Assembly:

1. Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specification and as indicated on approved final shop drawings. Fabricator shall coordinate joint fit-up procedures with erector. Provide camber in structural members where indicated. The General Contractor shall coordinate provision of all erection bolts, lifting lugs or other devices required for erection with the fabricator and the erector.

2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

3. Clearly mark the grade of steel on each piece, distinguishable in the field from floor surfaces, for purpose of field inspection and confirmation of grade of steel.

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B. Dimensional Tolerances: Dimensional tolerances of fabricated structural steel shall conform to Section 6.4 of the AISC Code of Standard Practice.

C. Splices in Structural Steel: Splicing of structural steel members in the shop or the field is prohibited without prior approval of the Engineer. Any member having a splice not shown and detailed on approved shop drawings will be rejected.

D. Cutting: Manual oxygen cutting shall be done only with a mechanically guided torch. An unguided torch may be used provided the cut is not within 1/8 inch of the finished dimension and final removal is completed by means such as chipping or grinding to produce a smooth surface quality free of notches or jagged edges. All corners shall be smooth and rounded to a minimum 1/2" radius.

2.3 WELDING

A. Code: All shop and field welding shall conform to all requirements in the "Structural Welding Code - Steel", ANSI/AWS D1.1, as published by the American Welding Society (AWS).

B. Welder Certification: All shop and field welders shall be certified according to AWS procedures for the welding process and welding position used. Submit certification certificates to the Architect for record purposes.

C. Minimum Size and Strength:

1. Fillet Welds: Minimum size of fillet welds shall be as specified in Table 1.17.2A in the AISC Manual of Steel Construction.

2. Minimum Strength of Welded Connections: Unless noted otherwise on the drawings, all shop and field welds shall develop the full tensile strength of the member or element joined. All members with moment connections, noted on the drawings with "MC", shall be welded to develop the full flexural capacity of the member, unless noted otherwise on the drawings.

D. Filler Metal Requirements: Weld metal shall be as specified in AISC Manual of Steel Construction Table 1.5.3.

E. Welding Procedures:

1. Welds not specified shall, if possible, be continuous fillet welds developing the minimum strength, as specified above, using not less than the minimum fillet welds as specified by AISC.

2.4 SURFACE PREPARATION AND PAINTING

A. Specification: Surface preparation, paint, and painting practices shall conform to the "Steel Structures Painting Manual", Volumes 1 and 2, as published by the Steel Structures Painting Council (SSPC).

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B. Scope: Shop paint all steel.

C. Surface Preparation and Primer Paint - Shop Painted Steel: All structural steel specified to be shop primed shall have paint applied in strict accordance with manufacturers instructions using prescribed surface preparation but not less than specified. Paint shall be applied immediately after surface preparation at a rate to provide a uniform dry film thickness of not less than 1.5 mils. Painting methods shall be used which result in full coverage of joints, corners, edges, and all exposed surfaces. Two coats shall be applied to surfaces which are inaccessible after assembly or erection. The color of the second coat shall be changed to distinguish it from the first coat.

Coordinate shop primer paint requirements with Architectural drawings and specifications.

PART 3 - ERECTION

3.1 ERECTION

A. Inspection: Erector shall examine areas and conditions under which structural steel work is to be installed and notify the Contractor and the Architect/Engineer in writing of conditions detrimental to proper and timely completion of the work.

B. Erection Tolerances: Erection tolerances of anchor bolts, embedded items, and all structural steel shall conform to the AISC Code of Standard Practice.

C. Field Assembly of Structural Steel:

1. As erection of the steel progresses, the work shall be fastened securely to take care of all dead load, wind and erection stresses. Particular care shall be exercised to ensure straightness and tautness of bracing immediately upon raising a steel column.

2. Provide temporary planking and working platforms as necessary to effectively complete work.

3. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure within specified AISC tolerances. The Contractor shall coordinate with Erector and Fabricator regarding possible discrepancies in member lengths between temperature at time of fabrication and temperatures during erection, and shall make necessary adjustments to ensure plumbness within AISC tolerances at 60°F. Compensate for cumulative welding draw, construction loadings, sequential applications of dead loads, or any other predictable conditions that could cause distortions to exceed tolerance limitations.

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4. On exposed welded construction, remove erection bolts, fill holes with plug welds or filler and grind smooth at exposed surfaces.

5. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces receiving field welds.

6. Comply with all bolting and welding requirements of Part 2 of this specification section.

7. Remove and replace existing finish materials as required to accomplish all work. The contractor shall comply with all fire codes when performing welding of steel or metal studs.

D. Field Modifications to Structural Steel: Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and structural fitting of parts shall be reported immediately to the Architect/Engineer, and approval of the method of correction shall be obtained. Approved corrections shall be made at no additional cost to the Owner. Do not use cutting torches, reamers, or other devices in the field for unauthorized correction of fabrication errors.

E. Miscellaneous Framing: Provide supplemental structural steel support framing for metal deck where normal deck bearing is interrupted by column flange plates or other framing members and other floor openings whether shown or not on either the architectural, mechanical, or structural drawings.

F. Removal of Erection Aids and Devices: The erector shall remove all erection aids and devices that interfere with architectural finish or MEP requirements.

G. Touch-Up Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas that have been shop painted. Apply paint to exposed areas using same material and surface preparation as used for shop painting. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

2. All field welded galvanized connections shall have welds protected with "Z.R.C. Cold Galvanizing Compound" as manufactured by Z.R.C. Products Company.

H. Clean Up: Clean up all debris caused by the Work of this Section, keeping the premises neat and clean at all times. Replace and repair to like new condition, all damaged areas of the interior and exterior of the building.

END OF SECTION 05 12 00

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SECTION 053100 - STEEL ROOF DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 - Specification sections, apply to work of this section.

1.2. SCOPE OF WORK

A. Supplier: The metal deck supplier shall furnish all metal deck materials and accessories indicated on the Architectural, Structural, and Mechanical Drawings required to produce a complete job including but not necessarily limited to deck units, cover plates, pour stops, metal deck edge closures, cell closures, cant strips, sump pans, and all related accessories.

B. Erector: The Subcontractor responsible for erecting the metal deck shall provide all labor and equipment as required to place all metal deck components and accessories as described above.

1.3 QUALIFICATIONS

The metal deck supplier shall be a manufacturer with a minimum of two years successful experience and with a minimum of two successful jobs of a comparable size and scope to this project.

1.4 QUALITY ASSURANCE

The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.

A. Codes and Standards: Comply with provisions of the following codes and standards except as otherwise indicated or specified:

1. "Design Manual for Composite Decks, Form Decks, and Roof Decks", as published by the Steel Deck Institute (SDI).

2. "Specification for the Design of Cold Formed Steel Structural Members", as published by the American Iron and Steel Institute (AISI).

3. "Structural Welding Code - Steel", as published by the American Welding Society (AWS).

B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with AWS procedures.

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1.5 SUBMITTALS

A. Product Certification: Submit manufacturer's specifications and installation instructions for each type of deck specified. Also submit a certificate of product compliance with SDI Standards as specified.

B. Shop Drawings: Submit detailed shop drawings showing type of deck, complete layout, attachment details, closures, edge strips, supplementary framing, and all other accessories.

C. Insurance Certification: Assist Architect and Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire, windstorm, and extended coverage insurance.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. See General Notes on the drawings for the location, depth, design thickness, section properties, and suggested manufacturer for all required roof decks.

2.2 GRADES OF STEEL

Steel deck shall be manufactured from steel conforming to ASTM Designation A611 Grades C, D, or E for painted deck or A446 Grades A, B, C, D, E or F for galvanized deck or Engineer approved equal, having a minimum yield strength of 33,000 PSI.

2.3 FINISH

A. Galvanizing: Steel deck shall be galvanized with a protective zinc coating conforming to ASTM A525 G60 class.

2.4 ROOF DECK ACCESSORIES

Provide minimum 20 gauge ridge and valley plates, minimum 20 gauge cant strips, minimum 14 gauge sump pans, minimum 20 gauge inside or outside closure channels, minimum 20 gauge butt strips at change of deck directions, minimum 20 gauge filler sheets, and rubber closures as required to provide a finished surface for the application of insulation and roofing.

2.5 FABRICATION

A. Metal Deck Spans: Metal deck spans shall not exceed the maximum center-to-center spans as required by SDI criteria. Where possible, all metal deck shall extend over three or more supports.

B. Metal Closure Strips: Fabricate metal closure strips of not less than 0.071" minimum (14 gage) cold-formed sheet steel. Form to provide tight fitting closures at open ends of cells or flutes and sides of decking. Provide sheet metal

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closures at all slab edges, columns, walls, and openings unless steel angles or bent plates are specified in details on the drawings. Also, provide wherever deck stops or changes direction. Weld closures at edge supports with 1" long weld at 12" maximum centers unless shown otherwise on the drawings. Provide minimum 2" bearing over steel support. Closures and support welds shall be designed to support a 200 pound concentrated load at the roof edge without exceeding a stress of 0.8 Fy.

2.6 ROOF OPENINGS

Roof openings less than 6" square or diameter require no reinforcement. Openings 6" to 10" inclusive shall be reinforced with a 20 gauge galvanized plate welded to the deck at each corner and 6" maximum centers with a 5/8" diameter puddle weld or sheet metal screws. Larger openings shall be referred to the Engineer for framing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install deck units as accessories in accordance with manufacturers recommendations and approved shop drawings, and as specified herein:

1. Place deck units on supporting framework and adjust to final position with ends accurately aligned and bearing 2" minimum on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.

2. Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.

3. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.

4. Do not place deck units on concrete supporting structure until concrete has cured and is dry.

5. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

6. Do not use roof deck units for storage or working platforms until permanently secured.

B. Attachment of Roof Deck:

1. Welding:

a. Typical Requirements: Roof deck units shall be welded to each structural support member using 5/8" diameter puddle welds at spacing shown on Typical Detail on plans. Weld metal shall

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penetrate all layers of deck material at end laps and side joints and shall have good fusion to the supporting members.

b. Side Laps: Side laps of adjacent units shall be fastened by sheet metal screws at spacing shown on Typical Detail on plans.

c. Welding Washers: Welding washers shall be used only when welding steel deck less than 0.028" thickness.

2. Minimum Bearing: Provide a minimum end bearing of 3" over supports.

3. End Laps: End laps of sheets shall be a minimum of two inches and shall occur over supports. Roofs having a slope of 1/4 inch or more in 12 inches shall be erected beginning at the low side to insure that end laps are shingle fashion.

C. Welding Requirements: Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.

D. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking.

E. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength continuity of decking and support of other work shown on the drawings.

F. Hanger Slots or Clips: Provide UL approved punched hanger slots between cells or flutes of lower element where roof deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures.

1. Hanger clips designed to clip over male side lap joints of roof deck units may be used instead of hanger slots.

2. Locate slots or clips at not more than 14" o.c. in both directions, not over 9" from walls at ends, and not more than 12" from walls at sides, unless otherwise shown.

3. Provide manufacturer's standard hanger attachment devices.

4. Loads hanging from metal deck slabs shall not exceed 100 pounds unless specifically detailed otherwise on the drawings.

G. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of deck units, except where taped joints are specified.

3.2 TOUCH-UP PAINTING

After deck installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.

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Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.

Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.

In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

3.3 INSPECTION

Welded decking in place is subject to inspection and testing by the Owner's Testing Laboratory. Expense of removing and replacing portions of decking for testing purposes will be borne by Owner if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work. Cost of such removal and replacement shall be borne by the Contractor.

END OF SECTION 05 31 00

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SECTION 053120 - STEEL FORM DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 - Specification sections, apply to work of this section.

1.2 SCOPE OF WORK

A Supplier: The metal deck supplier shall furnish all metal deck materials and accessories indicated on the Architectural, Structural, and Mechanical Drawings required to produce a complete job including but not necessarily limited to deck units, cover plates, pour stops, metal deck edge closures, cell closures, cant strips, sump pans, and all related accessories.

B Erector: The Subcontractor responsible for erecting the metal deck shall provide all labor and equipment as required to place all metal deck components and accessories as described above.

1.3 QUALIFICATIONS

The metal deck supplier shall be a manufacturer with a minimum of two years successful experience and with a minimum of two successful jobs of a comparable size and scope to this project.

1.4 QUALITY ASSURANCE

The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.

A Codes and Standards: Comply with provisions of the following codes and standards except as otherwise indicated or specified:

1 "Design Manual for Composite Decks, Form Decks, and Roof Decks", as published by the Steel Deck Institute (SDI).

2 "Specification for the Design of Cold Formed Steel Structural Members", as published by the American Iron and Steel Institute (AISI).

3 "Structural Welding Code - Steel", as published by the American Welding Society (AWS).

B Qualification of Field Welding: Qualify welding processes and welding operators in accordance with AWS procedures.

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C Underwriters Label: Provide metal deck units which are listed and conform to Underwriters Laboratories "Fire Resistance Directory", with each deck unit bearing the UL label and marking for specific system detailed. Provide units and construction, which are found in UL "Building Materials Directory" and conform to UL Uplift Class 90 construction.

D Factory Mutual Listing: Provide metal roof deck units which have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for "Class I" fire rated construction and "I-90" windstorm construction.

1.5 SUBMITTALS

A Product Certification: Submit manufacturer's specifications and installation instructions for each type of deck specified. Also submit a certificate of product compliance with SDI Standards as specified.

B Shop Drawings: Submit detailed shop drawings showing type of deck, complete layout, attachment details, closures, edge strips, supplementary framing, and all other accessories.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

See General Notes on the drawings for location of metal deck types and for depth of deck, minimum deck thickness, section properties of deck, concrete type, total slab thickness, slab reinforcement, and suggested manufacturer.

Acceptable deck manufacturers include the following:

Vulcraft/Div. Nucor Corp.
Wheeling Corrugating Co.
United Steel Deck, Inc.

Other manufacturers may be used only with Architect/Engineer approval.

2.2 GRADES OF STEEL

Steel Form Deck shall be manufactured from steel conforming to ASTM A611 Grades C, D, or E or ASTM A446 Grades A, B, C, D or E having a minimum yield strength of 33,000 PSI. The delivered thickness of uncoated steel shall not be less than 95% of the design thickness. Sheet metal accessories shall conform to ASTM A526, commercial quality.

2.3 FINISH

A Floor Deck:

1) Galvanized: Floor deck shall be galvanized with a protective zinc coating conforming to ASTM A525 G90 class.

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B Galvanizing Repair Paint: High zinc-dust content paint for repair of damaged galvanizing surfaces complying with Military Specifications MIL-P-21035 (Ships).

2.4 FABRICATION

A Metal Deck Spans: Metal deck spans shall not exceed the maximum center-to-center spans as required by SDI criteria. Where possible, all metal deck shall extend over 3 or more spans.

B Metal Closure Strips: Fabricate metal closure strips of not less than 0.071" minimum (14 gage) cold formed sheet steel. Form to provide tight fitting closures at open ends of cells or flutes and sides of decking. Provide sheet metal closures at all slab edges, columns, walls, and openings unless steel angles or bent plates are specified in details on the drawings. Also, provide wherever deck stops or changes direction. Weld closures at edge supports with 1" long weld at 12" maximum centers unless shown otherwise on the drawings. Provide minimum 2" bearing over steel support. Closures and support welds shall be designed to support the wet weight of concrete and a 150 pound concentrated load acting at the slab edge without exceeding a stress of 0.8 Fy; and the wet concrete weight alone without exceeding a stress of 0.6 Fy and a deflection of 3/4" maximum.

2.5 FLOOR SLAB REINFORCEMENT

A Placement of Slab Reinforcement:

1 Reinforcement shall be draped over the supports with the use of high chairs resulting in 3/4” top clear cover over the supports and 3/4” clear bottom cover at the mid-span between the supports.

2.6 FLOOR OPENINGS

For all openings in metal deck not framed with structural steel and greater than 10" in width in either direction, provide 1 - #5 x opening width + 1'-0" in a direction perpendicular to deck ribs each side of opening with bars bearing on top of ribs and 1 - #5 x deck span + 1'-0" each side of opening chaired 3/4" up from bottom of nearest deck rib running beside the opening from support to support. Provide blockout in slab for opening with deck uncut. Cut deck at opening after concrete has been poured and obtained 75% of its design strength.

2.7 CHLORIDE ADMIXTURES

The use of admixtures in concrete containing chloride salts shall not be permitted for metal deck concrete.

2.8 EXTRA CONCRETE REQUIRED FOR DECK DEFLECTION

The General Contractor shall include in his bid additional concrete required for metal deck slabs to account for deck deflection.

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PART 3 - EXECUTION

3.1 INSTALLATION

A General: Install deck units as accessories in accordance with manufacturers recommendations and approved shop drawings, and as specified herein:

1 Place deck units on supporting framework and adjust to final position with ends accurately aligned and bearing 2" minimum on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.

2 Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.

3 Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.

4 Do not place deck units on concrete supporting structure until concrete has cured and is dry.

5 Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

6 Do not use floor deck units for storage or working platforms until permanently secured.

B Attachment of Form Deck:

1 Welding - Floor Deck:

a Floor deck units shall be welded at each support. Deck units shall be screwed at each side lap.

2 Minimum Bearing: Provide a minimum end bearing of 2" over supports.

3 End Laps: End lap of sheets shall be a minimum of three inches and shall occur over supports.

C Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking.

E Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength continuity of decking and support of other work shown on the drawings.

F Hanger Slots or Clips: Provide UL approved punched hanger slots between cells or flutes of lower element where floor deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures.

1 Hanger clips designed to clip over male side lap joints of floor deck units may be used instead of hanger slots.

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2 Locate slots or clips at not more than 14" o.c. in both directions, not over 9" from walls at ends, and not more than 12" from walls at sides, unless otherwise shown.

3 Provide manufacturer's standard hanger attachment devices.

4 Loads hanging from metal deck slabs shall not exceed 100 pounds unless specifically detailed otherwise on the drawings.

G Joint Covers: Provide metal joint covers at abutting ends and changes in direction of deck units, except where taped joints are specified.

3.2 TOUCH-UP PAINTING

After deck installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.

Touch-up galvanized surfaces with galvanizing repair paint applied in accordance with manufacturer's instructions.

Touch-up painted surfaces with same type of shop paint used on adjacent surfaces.

In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

3.3 INSPECTION

Welded decking in place is subject to inspection and testing by the Owner's Testing Laboratory. Expense of removing and replacing portions of decking for testing purposes will be borne by Owner if welds are found to be satisfactory. Remove work found to be defective and replace with new acceptable work. Cost of such removal and replacement shall be borne by the Contractor.

END OF SECTION 05 31 20

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SECTION 05 40 00 - COLDFORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of coldformed metal framing used as structural support for exterior cladding is shown on the drawings.

B. Types of coldformed metal framing units include the following:

1. Non-load bearing studs

1.3 QUALITY ASSURANCE

A. Component Design: Compute structural properties of studs and joists in accordance with "Specification for Design of Cold-Formed Steel Structural Members" latest edition, as published by the American Iron & Steel Institute (AISI).

B. Codes and Standards:

1. "Structural Welding Code - Sheet Steel", AWS D1.3 as published by the American Welding Society (AWS).

2. "Recommended Practices for Resistance Welding Coated Low Carbon Steels", AWS C1.3, as published by the American Welding Society.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product information and installation instructions for each item of coldformed framing and accessories.

B. Shop Drawings: Submit shop drawings for all coldformed metal framing used to support exterior cladding. Shop drawings shall indicate placing of all framing members showing type, size, gage, number, location and spacing. They shall also indicate supplemental strapping, bracing, splices, bridging, accessories and details required for proper installation. Shop drawings must indicate type of fastening system used along with size and number of fasteners.

1. Welded connections shall show size and length of welds for all connections.

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2. Screwed connections shall show type, size, and number of screws for all connections. Submit manufacturers data giving strength values for screws used.

The Engineer of record will not be responsible for coldformed metal framing erected without approved shop drawings.

1.5 DELIVERY AND STORAGE

Protect metal framing units from rusting and damage. Deliver to project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade. Store off ground in a dry ventilated space or protect with suitable waterproof coverings.

PART 2 - PRODUCTS

2.1 SYSTEM COMPONENT

With each type of metal framing indicated on the Architectural or Structural Drawings, provide manufacturer's standard steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners and accessories as recommended by the manufacturer for applications indicated, as needed to provide a complete metal framing system.

2.2 GRADES OF STEEL

A. For 16-gage and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 psi and conform to ASTM A 446 and/or A 570.

B. For l8-gage and lighter units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 33,000 psi and conform to ASTM A 446 and/or A 570.

2.3 FINISH

A. Provide galvanized finish to all metal framing components complying with ASTM A 525 for minimum G60 coating.

2.4 FABRICATION

A. General: Framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line and braced against racking with joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion.

B. Connections:

1. Type: Connection of coldformed metal components shall be as indicated on the drawings.

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2. Design Forces: Connections of members shall develop the full allowable tensile force of the members connected unless calculations are submitted substantiating lower forces.

3. Welded Connections: Connection of coldformed metal components shall be made using arc welding or resistance welding methods. All welding shall be performed in accordance with the latest recommended procedures and practices of the American Welding Society, AWS C1.3 "Recommended Practices for Resistance Welding Coated Low Carbon Steels" and AWS D1.3 "Specification for Welding Sheet Steel in Structures". Welding process along with weld sizes and lengths necessary to develop the member forces specified shall be shown on the shop drawings. Protection of the weld area after welding shall be accomplished using a zinc-rich galvanizing repair paint.

4. Wire tying of framing components in structural applications shall not be permitted.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

Pre-Installation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work including door and window frames and mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.

3.2 INSTALLATION

A. Manufacturer's Instructions: Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations, unless otherwise indicated.

B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24" o.c. spacing for nail or powder-driven fasteners, or 16" o.c. for other types of attachment. Abutting pieces of track shall be securely spliced together. Provide fasteners at corners and ends of tracks.

C. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements. Splices in axially loaded and non-loaded bearing exterior cladding stud systems shall not be permitted.

D. Provide four (4) studs at each intersecting wall and three (3) studs at each corner.

E. Where stud system abuts structural columns or walls, anchor ends of stiffeners to supporting structure.

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F. Install supplementary framing, blocking and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.

G. Installation of Wall Stud System: Studs shall be seated firmly against the track webs allowing load transfer by direct bearing without complete dependence on the connection to the track. Connect studs to top and bottom runner tracks by either welding or screw fastening as indicated on the drawings at both inside and outside flanges.

H. Frame wall openings larger than 2'-0" square with double stud at each jamb of frame except where more than 2 are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.

I. Frame both sides of expansion and control joints, with separate studs; do not bridge the joint with components of stud system.

J. Horizontal Bridging:

1. Install horizontal bridging in all stud systems, spaced (vertical distance) at not more than 4'-0" o.c.

2. Provide stud bracing during construction as required for studs to carry construction loads.

K. Sheathing Attachment: Provide attachment of interior and exterior sheathing and wall material to each stud in accordance with AISI Specification.

END OF SECTION 05 40 00

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SECTION 05 50 00 – METAL FABRICATIONS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

A. Furnish all materials, labor and equipment shown on the drawings, specified herein or required for completion of the work.

MATERIALS

A. Unless noted otherwise on the plans, all structural steel shall comply with ASTM A36, latest edition and amendments.

SUBMITTALS

A. Provide completely detailed shop drawings showing anchorage placement, member placement and erection plans indicating all member sizes, locations, bridging, bracing, connections, methods of assembly, etc. The Contractor shall carefully check these drawings, then submit them to the Architect. The Architect may conduct limited spot checks aimed solely at determining general comprehension of the work detailed, then return them to the Contractor. The Contractor shall then carefully re-check the drawings and approve them prior to fabrication.

B. The Architect's spot check does not relieve the Contractor from correcting, at his own expense, any work or re-fabricating items which may be found not to comply with the requirements and intent of the plans and specifications.

DELIVERY, STORAGE AND HANDLING

A. Inspection: Accept metal fabrications on-site in labeled shipments. Inspect for damage.

B. Protect metal fabrications from damage by exposure to weather or by ground contact.

EXISTING CONDITIONS

A. Field Measure prior to fabrication. Indicate field measurements on Shop Drawings.

FABRICATION & ERECTION

A. Comply with requirements of the Manual of Steel Construction, Specifications for Buildings as amended to date, and the Code of Standard Practice, latest edition as adopted by the American Institute of Steel Construction. Welding shall comply with Standard Code of Arc and Gas Welding in Building Construction as published by the American Welding Society, except that all welding is by the electric arc process.

B. Welds shall be made only by welders and welding operators who have been qualified within the preceding 12 months by tests as prescribed in the Standard Code for Welding in Building Construction of the American Welding Society, to perform the type of welding required. All welders working on the project shall be assigned an identifying symbol to be place on or near each weld for identification. The Contractor shall maintain a record of all welders employed, date of qualification and identification symbol assigned to each.

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C. Field correcting or altering by “torching”, or otherwise, shall not be permitted unless prior approval is obtained from the Architect or Engineer. This applies to fabrication errors as well as work to accommodate other trades. Any errors which prevent the proper assembly of parts or components as detailed shall be reported to the fabricator for correction.

WELDS

A. All welds shall be full penetration fillet welds.

B. Grind all welds smooth prior to priming or galvanizing.

PAINTING

A. Steel to be primed shall receive a shop primer coat of Sherwin-Williams “KROMIK”, Pittsburgh “IRONHIDE”, Negley “ZINC CHROMATE RUST INHIBITIVE PAINT”, or equal. After erection, all field welds, bolts, and abraded areas of surfaces shall receive a touch-up of the same paint as the shop primer coat.

MISCELLANEOUS METAL ITEMS

1. MECHANICAL MEZZANINE ACCESS LADDERS (INTERIOR):

    A. Ladders to be fabricated using standard steel pipe rails with bent plate brackets and manufactured rung and rung covers as detailed on the drawings.
    B. Shop prime and touch-up after erection as specified above.

2. STEEL LINTELS:

    A. Fabricate from steel angles as detailed on the drawings. Unless shown otherwise, length shall be 1’-4” wider than the brick opening being spanned. For openings greater than 5’-0”, verify length of lintel with structural engineer.
    B. Hot-dip galvanize after fabrication.

3. ELEVATOR PIT LADDER:

    A. Ladder to be fabricated using steel components with bent plate brackets as detailed on the drawings or required by elevator manufacturer.
    B. Shop prime and touch-up after erection as specified above.

4. ELEVATOR SUMP PIT FRAME & GRATE:

    A. Fabricate sump pit grate frame from steel angles as detailed on the drawings.
    B. Hot-dip galvanize after fabrication.
    C. Grating to be IKG Borden Weldforged galvanized steel grating, Type WB with 1” x 3/16” bearing bars (7.2 lbs / sq. ft.) Provide saddle or z-clip anchors for securing grating to steel angle frame (min. 4 anchors per grate).

5. BOLLARDS:

    A. Fabricate bollards from steel pipe, plates and other components as detailed on the drawings.

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B. Shop prime and touch-up after erection as specified above or hot-dip galvanize after fabrication. Refer to notes on drawings.

6. STAIRS:

A. Fabricate from steel channels, pans, angles, tubes and other components as detailed on the drawings and designed by structural and steel stair supplier.
B. For exterior stair components, hot-dip galvanize all components after fabrication.

7. ALUMINUM HANDRAILS AND BRACKETS:

A. Furnish and install 1 5/8" O.D. aluminum tube rails for outdoor stairs and guardrails, unless noted otherwise. Include all other components required for finished installation. All work shall comply with local codes and Texas Accessibility Standards (TAS).
B. Refer to 05 52 00 Metal Railings.

8. ALUMINUM STAIR TREADS:

A. Tread planks shall b e extruded aluminum alloy 6063-T6 mill finish.
B. Provide channel end caps, Aluminum allow 6063-T6, clear anodized 204R1, AA-M10C22A31, Class II.
Hardware:
1) Bolts, Nuts: Hot-dipped galvanized or mechanically galvanized.
2) Hold-down Clip Assembly: Aluminum alloy 6005A-T6, mill finish.
3) Structural Hardware: Equal to or greater than hot-dipped galvanized ASTM-A307. No connections utilizing high strength bolts are classed as slip critical.
C. Stair Nose: Aluminum alloy, 6063-T6, non-skid black powder coated finish.

9. STEEL PIPE RAILINGS & GUARD RAILS:

A. Fabricate from steel tubes, and other components as detailed on drawings. Furnish and install 1 1/2" O.D. tube rails for outdoor stairs, guard rails and ramps, unless otherwise noted. . Include all other components required for finished installation. All work shall comply with local codes and Texas Accessibility Standards (TAS). Hot-dip galvanize all components after fabrication.
B. Touch-up after erection as specified above.
C. Refer to 05 52 00 Metal Railings.

10. STEEL ANGLE GUARDRAILING:

A. Fabrictae from steel angles, and other components as details on drawings. Guardrailing to be at all sides of press box landing and entry stairs as shown on drawings. Railing to be anodized aluminum with end plugs at ends of straight runs and/or elbows at corner. All guardrails shall be secured to angle rail risers by galvanized fasteners. Guardrailing on sides and back shall include 9-gauge galvanized chain link fencing fastened in place with galvanized fasteners and aluminum ties.

11. ALUMINUM SADDLE THRESHOLDS AT PRESS BOX:

A. Saddle Thresholds shall be extruded aluminum alloy 6063-T6 clear anodized.

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B. Provide saddle thresholds at bottom of Press Box exterior doors and Elevator doors. Coordinate final dimensions with Architect.
Hardware:
1) Bolts, Nuts: Hot-dipped galvanized or mechanically galvanized.

12. STEEL ENTRANCE JAMBS & HEADER:

A. Fabricate from steel tubes, and steel base plates as detailed on drawings. Include all other components required for finished gate installation. Hot-dip galvanize all components after fabrication. Coordinate with gate/fence manufacturer.
B. Field paint as scheduled after erection as specified above.

13. STRUCTURAL SUPPORTS

A. Other structural supports, steel sections, shape and size as indicated on Drawings required to support applied loads with maximum defelction of 1/240 of span; prime paint, one coate at interior applications. Hot-dip galvanize at all exterior applications.

NON - SHRINKING GROUT

A. Use non-shrinking grout as indicated on the plans. Use Master Builders Company “EMBECO”, Sonneborn Chemical & Refining Corporation’s “SONOGROUT 14K”, or equal, mixed according to the manufacturer’s written instructions.

MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports that are not a part of the structural steel framework as necessary to complete work.

B. Fabricate units from structural steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles inidicated and as necessary to receive adjacent constructoin retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

MISCELLANEOUS

A. Furnishing bolts, anchors, inserts, drive pins, expansion shields, lag screws, ramset fasteners, toggle bolts, dovetail anchors and other fastening devices as required and/or indicated on the drawings necessary for the fastening of wood nailing and stripping and furring members to each other and to masonry, concrete or other adjoining materials needed to complete the work is an obligation of the General Contractor, and he shall be responsible for their furnishing and erection whether they are mentioned in other divisions of these specifications or not.

END OF SECTION 05 50 00

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SECTION 05 52 00 – METAL RAILINGS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements including but not limited to:
   1. Aluminum pipe and tube railings.
   2. Accessories necessary for a complete installation.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer licensed in the State of Texas and experienced in the design of railings, including attachment to building construction.

B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Handrails and Top Rails of Guards:
      a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
      b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.

   2. Infill of Guards:
      a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
      b. Infill load and other loads need not be assumed to act concurrently.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   1. Temperature Change: 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C, material surfaces).

1.3 SUBMITTALS

A. Product Data: Technical data for railings and the following:
   1. Manufacturer's product lines of mechanically connected railings.
   2. Railing brackets.
   3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.
   1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
   2. Fittings and brackets.
   3. Assembled Sample of railing system, made from full size components, including top rail, post, handrail, and infill. Sample need not be full height.
      a. Show method of connecting and finishing members at intersections.

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D. Delegated design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Qualification Data: For testing agency.

F. Mill Certificates: Signed by manufacturers of stainless steel products certifying that products furnished comply with requirements.

G. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

H. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

I. Evaluation Reports: For post installed anchors, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Building Code: Comply with applicable provisions of the IBC for railings.
   2. Welding Qualifications: Qualify procedures and personnel according to the following:
      a. AWS D1.2/D1.2M Structural Welding Code - Aluminum.
      b. AWS D1.6/D1.6M Structural Welding Code - Stainless Steel.

B. Source Limitations: Obtain each type of railing from single source from single manufacturer.

1.6 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

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2.1 MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products by the following
   1. Steel Pipe and Tube Railings:
      a. Wagner, R & B, Inc.

B. Metal Surfaces: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

C. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.
   1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2 inch (38 mm) clearance from inside face of handrail to finished wall surface.

D. Steel and Iron:
   1. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
   2. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
      a. Provide galvanized finish for exterior installations and where indicated.

   3. Plates, Shapes, and Bars: ASTM A 36/A 36M.
   4. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
   5. Aircraft Cable for Infill: 7 X 7, Type 302, Stainless steel cabling.

E. Fasteners: Provide the following:
   1. Aluminum Railings: Type 316 stainless steel fasteners.
   2. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
   3. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
   4. Fasteners for Interconnecting Railing Components:
      a. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
   5. Post Installed Anchors: Torque controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
      a. Material for Interior Locations: Carbon steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
      b. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 (A4) stainless steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

F. Miscellaneous Materials:
   1. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

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a. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

2. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
3. Galvanizing Repair Paint: High zinc dust content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
4. Shop Primer for Ferrous Metal: Universal primer, organic zinc rich primer, complying with SSPC-Paint 20 and compatible with topcoat. Provide 10-99 (red) or 10-09 (gray) by Tnemec Company.
5. Universal Shop Primer: Fast curing, lead and chromate free, universal modified alkyd primer and compatible with topcoat. Use primer containing pigments that make it easily distinguishable from zinc rich primer.
6. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc coated metal and compatible with finish paint systems indicated.
7. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in steel, complying with SSPC-Paint 20. Provide Tneme-Zinc 90-97 by Tnemec Company.
8. Bituminous Paint: Cold applied asphalt emulsion complying with SSPC-Paint 12, containing no asbestos fibers, or cold applied asphalt emulsion complying with ASTM D 1187 ASTM D 1187/D 1187M.
9. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.2 FABRICATION

A. Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with either welded or nonwelded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
   1. Use materials and methods that minimize distortion and develop strength and corrosion

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resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

J. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

K. Form Changes in Direction:
1. As detailed. Refer to Drawings.

L. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

M. Close exposed ends of railing members with prefabricated end fittings.

N. Provide wall returns at ends of wall mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.

O. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

P. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

Q. For railing posts set in concrete, provide steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.

R. For removable railing posts, fabricate slip fit sockets from steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

S. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open sided floors and platforms. Fabricate to dimensions and details indicated.

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2.3 FINISHES

A. Aluminum Finishes:
   1. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
   2. Powder Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
      a. Color and Gloss: Selected by Architect

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
   3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (6 mm in 3.5 m).

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
   1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in place construction.

F. Installing loose hand and guard rails with core drill attachment - fill annular space with non-shrink grout filled to top surface and crowned to provide positive drainage away from railing.

G. Installing loose hand and guard rails with bolted attachment - install base plates flush and true, tighten anchors and remove excess exposed bolt. Remove rust from cut fastener and galvanize per specificationand manufacturer's recommendation.

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3.3 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

3.4 ANCHORING POSTS

A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Form or core drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout mixed and placed to comply with anchoring material manufacturer's written instructions.

C. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.

D. Leave anchorage joint exposed with anchoring material flush with adjacent surface.

E. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members:
   1. For aluminum pipe railings, attach posts using fittings designed and engineered for this purpose.

F. Install removable railing sections, where indicated, in slip fit metal sockets cast in concrete.

3.5 ATTACHING RAILINGS

A. Anchor railing ends at walls with round flanges anchored to wall construction and to railing ends or connected to railing ends using nonwelded connections.

B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends or connected to railing ends using nonwelded connections.

C. Attach railings to wall with wall brackets, except where end flanges are used. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

D. Secure wall brackets and railing end flanges to building construction as follows:

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1. For concrete and solid masonry anchorage, use drilled in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.
3. For steel framed partitions, use hanger or lag bolts set into [fire retardant treated] wood backing between studs. Coordinate with stud installation to locate backing members.
4. For steel framed partitions, use self tapping screws fastened to steel framing or to concealed steel reinforcements.
5. For steel framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.6 ADJUSTING AND CLEANING

A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water

B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop painted surfaces.
   1. Apply by brush or spray to provide a minimum 2.0 mil (0.05 mm) dry film thickness.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 05 52 00

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SECTION 06 10 00 – ROUGH CARPENTRY

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SECTION INCLUDES

A. All rough carpentry items including, but not limited to:
   1. Wood blocking for support of items supported on or recessed into wood framing or requiring wood blocking for support.
   2. Wood cants, nailers, curbs, and other items associated with roofing work.
   3. Miscellaneous framing items and plywood sheathing.

RELATED WORK

A. All Sections of Work supported on or recessed into wood framing or requiring wood blocking for support, such as wall trim, wall cabinets, handrails, lockers, toilet compartments, toilet accessories, markerboards, tackboards, projection screens, fire extinquisher cabinets, etc., as applicable to the Project.

LUMBER GRADING

A. Each piece of plywood used shall carry the American Plywood Association trademark.

B. Grading Rules: Conform with all applicable requirements of American Lumber Standards “Simplified Practice Recommendations R-16” and to grading rules of manufacturer’s association under whose rules the lumber is produced.

C. Reference Standards: Conform with all requirements.
   1. U.S. Dept. of Commerce Product Standards (PS)
   2. American Plywood Association (APA)
      a. Standards and Construction Guide
   3. American Wood Preservers Association (AWPA)
      a. Standards, as they apply.
   4. Architectural Woodwork Institute (AWI)
      a. Quality Standards
   5. National Woodwork Manufacturers Association (NWMA)
      a. Standards
   6. Western Wood Products Assocation (WWPA)
      a. Manual

LUMBER

A. Lumber:
   1. Treated No. 2 S4S Southern Yellow Pine, #1 kiln dried.
      a. Comply with NWMA Standards
      b. Use for blocking, stripping, grounds, cants and miscellaneous wood items in contact with concrete, roofing, or exposed to the weather.
   2. No. 2, S4S Southern Yellow Pine: Use for framing, blocking, stripping and micellaneous concealed interior lumber not exposed to concrete, roofing weather or moisture, when FRS lumber is not required by building code.

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3. Fire Retardant No. 2, S4S Southern Pine: Refer to Fire Retardant Treatment below. Use for framing, plates and blocking in all walls and partitions where required by building code or noted on drawings.

B. Plywood:
   1. General: Comply with APA Standards.
   2. APA A-D, Group 1 interior used where appearance of only one side is exposed to view for interior locations. Use for wall liner at MDF/IDF closets and telephone boards in mechanical and electrical rooms where shown or required. 3/4 inch thick unless required or shown otherwise. Paint as scheduled.
   3. Exterior plywood, Group 1, APA rated sheathing. Use where miscellaneous plywood is exposed to concrete, weather, or at roof construction as sheathing.
   4. Fire Retardant Treated Plywood: Refer to Fire Retardant Treatment below. Use when required by building code or noted on drawings.
   5. Underlayment: If shown or required, APA rated Sturdi-floor, exterior grade, tongue and groove edges.

C. Wood Treatment:
   1. Preservative Treatment (Concealed Conditions):
      a. Borage: Pressure impregante preservative to net retentioin of 0.28lbs/cu.ft., in plant licensed by manfuacturer in accordance with the following standards:
         1. Preservative Treatment Standard: AWPA P5\
         2. Structural Lumber Treatment Standard: AWPA C31
         3. Plywood Treatment Standard: AWPA C9
      b. Brush two (2) coats of preservative on bored or sawn surfaces of treated lumber.
      c. Provide Quality Mark Stamp or end tag identifiying third party inspection agency on treated wood for identification.
      d. Concealed conditions mean conditions that are interior, above ground that are not exposed to direct standing water, incontact with natural grade, or exposed to weather.
      e. ACQ and CCA preservatives not permitted.
      f. Acceptable Manufacturers: Osmose “Advance Guard”; Univeral Forest Products “Prowood Borate”; or Architect approved equal.

   2. Fire Retardant Treatment:
      a. Lumber shall be pressure-impregnated with non-combustible fire retardant chemicals in accordance with U.L. FRS Fire Hazard Classification. All lumber must be dried following treatment in accordance with AWPA Standard C20.
      b. Plywood shall be pressure-impregnated with non-combustible fire retardant chemicals in accordance with U.L. FRS Fire Hazard Classification. All plywood must be dried following treatment in accordance with AWPA Standards C27.

D. Refer to Structural Drawings for notes relative to wood framing as well. Any wood types or structural properties referred to specifically on the structural drawings supersede these specifications.

INSTALLATION

A. Wood Framing:
   1. Framing and blocking shall be accurately cut and fitted true to line and levels, avoiding shims and wedges.
   2. Spiking and nailing shall be done using largest size spikes and nails.

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3. Unless otherwise shown, use 2 inch by 4 inch wood studs spaced 16 inches o.c. bottom plate and double-top plates 2 inches thick by width of studs.
4. Bolt nailers and blocking to steel, masonry or concrete members with bolts or proportionate strength of members attached from each end, except as otherwise noted on plans.
5. Provide blocking, bucks and framing as necessary and for other trades as required.
6. Drill lumber accurately for bolts and fit all bolts with suitable washers.

B. Plywood:
1. Install plywood over framing in accordance with instruction of American Plywood Association Construction Guide From No. E30C.
2. Install underlayment plywood as shown in accordance with instruction of American Plywood Association. Space panel joints and edges 1/32 inch. Fill and sand panel edge joints, surface roughness, and damaged or open areas. Nail with 4d ring-shank nails spaced at six (6) inches at edges and eight (8) inches in field each way.

C. Treated fascia, curbs, cant strips, nailers, etc., shall be nailed or bolted as shown on the drawings and set straight and even.

D. Parapet cap blocking, window and door bucks and blocking, nailers, etc., shall be screwed, nailed, bolted or attached with drive-pin fasteners as shown on the drawings and set straight and even.

E. Bolts or other fasteners shall be placed a maximum of 18” from the end of all pieces.

ROUGH HARDWARE

A. Use common nails, typically, but countersunk wood screws for all tension joints.

B. All fasteners and other hardware exposed to weather shall have a galvanized finish. Refer to literature provided by manufacturer of pressure treated lumber and provide finishes on all fasteners used for treated lumber that are approved by the manufacturer to resist corrosion due to contact with chemicals used in the wood treatment process.

C. Bolts and other anchors shall have a minimum 3/8” diameter unless shown otherwise. Provide washers when securing wood. Bolts and anchors shall have galvanized finish when used in exterior exposure, exterior wall construction or placed in slabs on grade. Provide the proper type of bolt or anchor, i.e., bolt and nut, toggle bolt, expansion bolt, bolt and lead shield, lag screws, etc., as required by condition of use.

D. Refer to Structural Drawings for notes relative to fasteners, joist hangers or other special hardware needed when adding additional lumber members to strengthen existing structural components of the building.

E. Unless shown otherwise on the drawings all nailing and fastening of framing members shall at a minimum be in accordance with Table 2304.10.2, Fastening Schedule, in the 2021 International Building Code.

WORKMANSHIP

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A. Carefully plan and lay out all work as required to carry out the intent of the contract documents. Coordinate with other trades requiring stripping, blocking, nailers, etc., and locate these items as required to properly accommodate their work.

END OF SECTION 06 10 00

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SECTION 06 20 00 – FINISH CARPENTRY

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SECTION INCLUDES

A. Providing all finish carpentry items including, but not limited to:
   1. Finish Carpentry
   2. Millwork and Cabinetry
   3. Plastic Laminate
   4. Millwork Hardware
   5. Miscellaneous Millwork.

REFERENCE SPECIFICATIONS

A. Work under this section shall be governed by “Quality Standards of the Architectural Woodwork Industry”, AWI (Latest Edition), Premium Grade except when another grade is specifically referenced.

B. Fabricator must demonstrate a minimum of five (5) years experience in manufacture of architectural woodwork that complies with AWI Standards.

SUBMITTALS

A. Product Data:
   1. Manufacturer’s specifications and other data needed to prove compliance with specified requirements.
   2. Manufacturer’s preprinted product information for all hardware proposed on the project.
   3. Manufacturer’s preprinted maintenance instructions for the casework hardware.

B. Shop Drawings:
   1. Indicate size, material and finish.
   2. Show locations and installation procedures, including hardware, sinks, service fixtures, trim and other pertinent data for each unit.

C. Certification: Provide AWI Quality Certification Program certification for casework fabrication and installation, or upon awarding of the work, register the work under this section with the AWI Certification Program.

D. Samples: Two (2) each, 6 inch by 6 inch by 3/4 inch sample of specified particleboard core with grade stamp for use as verifcaiton of installed product.

MILLWORK MATERIALS

SOLID STOCK WOOD

A. Stain grade, base, wall trim, door trim, window trim, cabinet style, rail, trim, banding, drawer faces, corner blocks, handrails, chair railing, etc. and other pieces as detailed on the drawings shall be S4S, select maple, grade 1.

B. Stained decorative ornaments, railings, wood caps, etc. as detailed on the drawings shall be cut from S4S, select maple, grade 1.

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C. Mill all solid stock wood to sizes and shapes as detailed on the drawings, use longest lengths possible and miter corners and joints.

D. Paint grade projection screen mounting boards, wall trim, etc. shall be S4S, C & better grade, fir, poplar or parana pine.

E. Moisture content at time of installation shall be between 8% and 13% in relation to oven-dry weight.

PLYWOOD

A. Plywood shall be AWI premium grade with lumber or veneer core. Particleboard cores are not acceptable.

B. Plywood for painted telephone/data equipment boards shall have A-B grade birch paint-grade veneer. Wood edge where exposed to view and wood edge all sides of adjustable shelving.

C. Plywood for wall paneling, stained cabinets and shelving shall have premium solid piece white oak veneer, grade 1. Wood edge where exposed to view and wood edge all sides of adjustable shelving.

PLASTIC LAMINATE

A. High-pressure decorative laminate complying with NEMA LD3, and the following requirements:
   1. Exterior Color Selection Available:
      a. Architect to select from minimum of 250 selections available, including wood grain patterns and solid colors, reference finish schedule.
   2. Laminate grades:
      a. Exposed doors, finished end panels, and other vertical surfaces; GP28 (0.028 inch thick nominal)
      b. Horizontal surfaces other than top: GP28 (0.028 inch thick nominal)
      c. Cabinet Liner: CL20 (0.020 inch nominal), white.
      d. Work Surfaces and Countertops: GP50 (0.050 inch thick nominal) with BK20 (0.20 inch thick) backer sheet.
      e. Backsplash: PH42 (0.042 inch thick nominal) with nominally balanced backer sheet.
   3. Adhesive: PVA water resistant adhesive. Contact adhesives not permitted.
   4. Pressure Fused Laminate:
      a. NEMA LD3 VGL, and NEMA LD3 CLS, Melamine resin impregnated, 120 gram PSM minimum, thermofused to core under pressure.
      b. Color:
         1) Closed interiors, underside of wall cabinets: White.
         2) Exposed and Semi-exposed open cabinets: Match exterior.
      c. Provide balanced construction with same thermofused melamine. Unsurfaced coreboard or simple backers not allowed.

CABINETS & SHELVING

A. The following definitions shall apply to cabinetwork:

   1. Exposed; surfaces visible when doors and drawers are closed. Bottoms of cases and shelves more than 2’-0” above the floor and the back of hinged doors.

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2. Semi-exposed; surfaces that become visible when drawers and doors are opened. Tops of cases and shelves more than 6’-0” above the floor and bottoms of cases and shelves less than 2’-0” above the floor.
3. Concealed; surfaces permanently hidden after installation such as backs or sides of cabinets against walls.

B. The following thicknesses of materials shall be used for cabinet construction and shelving unless noted differently on the plans:

1. Cabinet bottoms, ends and divisions shall be 3/4” thick.
2. Face plates shall be equal to door thickness with 3/4” minimum.
3. Cabinet backs and drawer bottoms shall be 1/4” thick plywood (1/2” plywood for file drawer bottoms). Drawers over 24” wide require center bottom support. Reinforce backs with strips or braces to limit area to 12 square feet.
4. Drawer fronts shall be 3/4” thick.
5. Drawer backs and sides shall be 1/2” thick.
6. Shelves shall be 3/4” thick up to 41” wide.
7. Install 3/4”x1-1/2” thick edge on front of 3/4” shelves 42” wide and over.
8. Doors shall be 3/4” thick.
9. Doors shall be 3/4" thick with perimeter moulding when detailed on drawings.

C. Cabinet construction shall be a modified half or partial overlay style with 1-1/2" of cabinet face stiles and rails typically showing between doors and drawers faces.

HARDWARE

A. The following cabinet hardware shall be provided.

1. Hinges shall be Salice, 120 degree, casework hinge, or equal, and required baseplates for half or partial overlay construction. Provide blocking behind face stiles at hinge locations. Provide number of hinges as recommended by manufacturer for particular door size and weight.
2. Door and drawer pulls shall be Stanley 4477AL-4”, “Ribbon Pulls” or equal.
3. Standard drawer slides shall be KV 8400 series, 100 lb. rated, full extension, or equal.
4. File drawer slides shall be KV 8500 series, 150 lb. rated, full extension,or equal.
5. File drawers shall have KV 476F ZC letter-size file followers with KV 476TZC track, or equal. Provide 1/2” thick plywood drawer bottoms at file drawers and recess follower track in 2-1/4” wide x 1/4” deep slot.
6. Adjustable cabinet shelving standards shall be KV 255BRN with KV 256WAL supports, or equal.
7. Adjustable wall mounted shelving standards shall be KV 87ANO with KV 187ANO heavy duty brackets, or equal. Provide wood blocking in walls at standard locations.
8. Cabinet door and drawer locks, when shown on plans, shall be National C8053-14 cam locks, or equal, keyed alike in groups as directed by Owner.
9. Countertop support brackets shall be concealed aluminum counter support brackets by Rakks Counter Support Brackets, style EH-1818FM.

FABRICATION

A. Fabricate architectural woodwork in strict accordance with AWI Standard Details for Grade specified, shop assemble in the largest possible sections and deliver to site.

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B. Provide that work that cannot be shop assembled be given trial fit at the shop to ensure proper and expeditious field assembly. Join shop assemblies with mortise and tenon and dowels and glued blocks where practical. Mortises and tenons shall be of such size as will provide maximum strength in assembled joint. Provide blind tenons where exposed in finished work.

C. When necessary to cut and fit on site, provide material with ample allowance for cutting; provide trim for scribing and site cutting.

D. Apply plastic laminate finish in full, uninterrupted sheets consistent with manufactured sizes; corners and joints hairline; slightly eased edges.

E. Mechanically fasten backsplash to countertops with concealed steel brackets at 16” on center.

F. Apply laminate balancing sheet to reverse side of surface finished with plastic laminate in accordance with AWI Standard.

G. Shop assemble architectural woodwork items for delivery to site in sizes easily handled and to ensure passage through building openings.

SITE CONDITIONS

A. Deliver architectural woodwork products only when site environmental conditions are adequate to receive such products.

B. Store products in ventilated areas with constant temperatures between 60 degrees F and 80 degrees F and relative humidity between 25 and 55 percent.

C. Maintain temperature and humidity in installation area as required to maintain content of installed woodwork within a 1.0 percent tolerance of the optimum moisture content from the date of installation through the remainder of the construction period.

INSTALLATION – GENERAL

A. Install woodwork plumb, level, true and straight with no distortions. Shim as required using concealed shims.

B. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces. Repair damaged finish at cut ends.

C. Install to a tolerance of 1/8” in 8’-0” of plumb and level (including tops). Variations in flushness of adjoining surfaces are unacceptable.

D. Anchor woodwork to built-in blocking or attach directly to substrates.

E. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing.

F. Leave surfaces clean and true with exposed wood sanded parallel with grain, free of discernable marks, dusted and ready for final finish.

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G. Countersink semi-concealed anchorage devices used to wall-mount components and conceal with solid plugs of species to match surrounding wood. Place flush with surrounding surfaces.

INSTALLATION – CABINETS

A. Install countertops no more than 1/8” in 8’-0” of sag, bow or other variation from a straight line.

B. Carefully scribe cabinetwork which is against other building materials leaving gaps of 1/32” maximum. Do not use overlay trim for this purpose.

C. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Make cutouts for field penetration only after Architect’s approval. Prime paint or seal contact surfaces of cutouts.

D. Anchor tops secure to base units and other support systems.

ADJUSTMENT & CLEANING

A. Repair damaged and defective woodwork to eliminate functional and visual defects.

B. Where repairs are not acceptable to Architect, replace woodwork. Adjust joinery for uniform appearance.

C. Clean woodwork on exposed and semi-exposed surfaces.

D. Touch up damaged and soiled finishes and adjacent areas.

MATERIAL LOCATIONS

A. Press Box Counters shown on drawings.

END OF SECTION 06 20 00

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SECTION 07 11 13 – BITUMINUOUS DAMPPROOFING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. Section Includes:
   1. Cold applied asphalt emulsion dampproofing and vapor retarder for:
      a. Exterior below-grade surfaces of concrete foundation walls and beams (not surfaces exposed to view).
      b. Below Grade Footings, columns, beams and foundation walls where opposite side of surfaces are building spaces, whether occupied or not
   2. Seal Strip Membrane and primer at joints between concrete masonry and steel columns and beams and to window and door frames.

B. Related Requirements:
   1. Section 03 30 00 – Cast-In-Place Concrete.
   2. Section 04 20 00 – Unit Masonry Assemblies.
   3. Section 06 10 00 – Rough Carpentry.
   4. Section 07 21 00 – Board (Rigid) Insulation.
   5. Section 07 27 20 – Fluid-Applied Air Barrier Assembly.
   6. Section 07 60 00 – Flashing, Sheet Metal and Trim.

REFERENCES

A. ASTM International:
   1. ASTM D1227 Type II, Class I

B. National Roofing Contractors Association
   1. NRCA Waterproofing Manual.

C. EPA Guidelines for VOC/VOS compliant materials.

COORDINATION

A. Coordinate compatibility of Dampproofing with board insulation, flashing, other materials in contact with dampproofing and system warranties.

SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide properties of mastics.

C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

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B. Store materials in a clean, dry area in accordance with manufacturer's instructions.

C. Store at temperatures of 40° F (5° C) and above to facilitate handling.

D. Do not store at temperatures above 90° F (32° C) for extended periods.

E. Keep away from sparks and flames.

F. Protect materials during handling and application to prevent damage or contamination.

QUALITY ASSURANCE

A. Perform Work in accordance with NRCA Waterproofing Manual.

B. Installer shall secure certification from both the dampproofing and insulation manufacturer that the two materials are compatible.

C. Asbestos Free Material/Product: Prior to approval of the material/product to be used, the manufacturer/supplier shall furnish the Architect with Certification that the material/product contains no asbestos. This certification is mandatory before approval will be issued. Submittals furnished without the asbestos-free Certification will be returned to the Contractor with no action taken until such Certification is provided.

QUALIFICATIONS

A. Manufacturer: Shall have been a producer of fibered asphalt emulsions for not less than five years.

B. Applicator: Company specializing in performing the Work of this Section with minimum three years documented experience.

ENVIRONMENTAL REQUIREMENTS

A. Product not intended for uses subject to abuse or permanent exposure to the elements.

B. Do not apply membrane when air or surface temperatures are below 35° F (2° C).

C. Do not apply to frozen concrete.

D. Do not apply when rain is imminent.

MANUFACTURERS

A. W.R. Meadows, Fibrated asphalt emulsion; Sealmastic Type II.
B. Karnak Corporation; Fibrated Emulsion Dampproofing; #220AF
C. BASF Corporation; fiber reinforced emulsified-asphalt dampproofing; MasterSeal 615.
D. Substitutions: Under provisions of Section 01 25 00.

MATERIALS

A. Fibered Asphalt Emulsion:

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1. Brush or, Roller Applied emulsion dampproofing should be an asphalt-based, clay emulsion with fibers specifically formulated to offer a tight film that combines both excellent strength and resistance to water.
   a. Sealmastic Type II by W.R. Meadows
2. Trowel-applied emulsion dampproofing should be a trowel-applied mineral colloid, asphalt emulsion fibrated with selected fibers and produced in an ideal, light-trowel application consistency. It should offer high weather, water, corrosion, and abrasion resistance. It can be used as an adhesive on foam board installations.
   a. Sealmastic Type III by W.R. Meadows

3. Will not burn or support combustion in a liquid state.

4. Compatible with extruded polystyrene insulation and adhesives.

5. Odor Elimination: For interior and concealed-in-wall uses other than exterior face of inner wythe of cavity walls, provide dampproofing material warranted by manufacturer to be substantially odor free after drying for 24 hours under normal conditions.

ACCESSORIES

A. Board Insulation: 2 inch thick Polyiso as specified in Section 07 21 00, Board Insulation.

B. Joint Stripping: Asphalt-coated, glass-fiber felt, complying with ASTM D1668, Type I.

C. Seal Strip Membrane: Refer to Section 07 62 00.

EXAMINATION

A. Verify substrate surfaces are durable, free of oil, dirt, laitance, loose material and any other matter detrimental to adhesion or application of dampproofing system.

B. Verify items that penetrate surfaces to receive dampproofing and accessories are securely installed.

PREPARATION

A. Protect adjacent surfaces not designated to receive dampproofing.

B. Clean and prepare surfaces to receive dampproofing and accessories in accordance with manufacturer's instructions.

C. Dampen dry surfaces with water prior to application of dampproofing.

D. Do not apply dampproofing to surfaces unacceptable to manufacturer or applicator.

E. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate prior brush or spray application.

SEAL STRIP MEMBRANE INSTALLATION

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A. Install Seal Strip Membrane primer to clean dry concrete masonry and concrete column and beam surfaces in accordance with manufacturer’s printed instructions. Install Seal Strip Membrane before dampproofing is applied.

B. Install Seal Strip Membrane in accordance with manufacturer’s printed instructions.

APPLICATION

A. Apply dampproofing in accordance with manufacturer's instructions.

B. Ensure accessory materials are compatible with membrane and approved by membrane manufacturer.

PROTECTION

A. Protect membrane with immediate application of protection course if no drainage system is used or rolled matrix drainage system.

B. Backfill within 24 - 48 hours using care to avoid damaging the dampproofing

END OF SECTION 07 11 13

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SECTION 07 21 00 – THERMAL AND ACOUSTICAL INSULATION

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

A. Install rigid cavity wall insulation on CMU and metal stud backup prior to installation of metal wall panel and masonry veneer.

B. Install rigid insulation board on underside of metal deck at press box rooms prior to installation of metal soffit panel.

C. Install batt insulation used for thermal and sound insulation in stud walls, and where shown on drawings or required.

D. Install thermal batt insulation between joists/structure, under steel roof deck, and crevices in exterior wall and roof construction.

SUBMITTALS

A. Product Data:
   1. Manufacturer's literature on each insulation type specified.
   2. Manufacturer's installation instructions for each insulation type specified.

B. Samples: Six (6) inch x six (6) inch piece of rigid insulation for Architect's approval.

C. Certifications:
   1. Manufacturer's certification of compatibility of rigid insulation with dampproofing mastic.
   2. Manufacturer's affidavit that materials used in Project contain no asbestos.

PERFORMANCE

A. Foil-Faced, Polyisocyanurate Board Insulation: ASTM C1289, Type I, Class 1, with maximum flame-spread and smoke-developed indexes of ≤ 25 and ≤ 450, per ASTM E84.
   1. Minimum Compressive Strength ≥25 psi when tested per ASTM D1621
   2. Minimum Tensile Strength ≥1000 when tested per ASTM C209
   3. Minimum Flexural Strength ≥40 psi when tested per ASTM C203
   4. Water Vapor Transmission ≤0.05 perms per inch when tested per ASTM E96
   5. Water Absorption Maximum ≤1% by volume when tested per ASTM C209
   6. Dimensional Stability, Maximum ≤0.05% length and width, and ≤3.5% thickness when tested per ASTM D2126
   7. R-value per thickness: 1"=R-6.5, 1.5"=R-10, 2"=R-13.

PRODUCTS

RIGID INSULATION

A. Cavity wall insulation shall be 2" thick Dow Thermax Cavity Wall Insulation (Basis of Design) with reinforced polyisocyanurate foam core and reinforced foil facing. Provide in 48" wide and 96" long units.

B. Other Manufacturers subject to compliance with requirements:

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1. Firestone Building Products; Enverge CI Glass Exterior Wall Insulation.
2. Atlas Roofing, AtlasWall EnergyShield Pro.

C. Adhesives and Fasteners:
   1. Provide Mechanical fasteners and adhesive suitable for CMU backup shall be as recommended or approved by insulation manufacturer.

D. Joint Tape:
   1. Provide matching foil faced joint tape as manufactured by Dow to use with this product. Provide enough additional tape as may be needed to cover and repair nicks and cuts in insulation's foil facing which might occur during installation.

E. Acoustical Insulation:
   1. 2" thick Owens-Corning 703 Semi-Rigid fiberglass insulation board. Provide installation with impailing pins as recommended or approved by insulation manufacturer.

BATT INSULATION

A. Interior wall thermal/acoustical insulation shall be 3 1/2" thick, R-11 unfaced fiberglass as manufactured by Owens Corning Fiberglass Corporation (Basis of Design).

B. Other Manufacturers subject to compliance with requirements:
   1. CetainTeed Corporation.
   2. Knauf Insualtion.

C. Insulation Batt shall be fiberglass or spun mineral fiber and resinous binders formed into flexible blankets or batts.
   1. Facing: Unfaced
   2. Comply with ASTM C665, Type III, Class A
   3. Batt Size: 16 inches wide x 96 inches long
   4. Thermal Resistance Value: R value of 19 at wall locations
   5. Pressure Sensitive Tape: Permanent Type as recommended by insulation manufacturer.
   6. Tie Wire: Minimum 16 gauge aluminum or other non-ferrous material.

EXAMINATION

A. Consult with tradesmen whose work precedes and follows insulation installation to insure that their preparatory and finish work coordinates in an orderly fashion with work under this section.

B. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

C. Do not install any insulation until the building has been made substantially water and weathertight.

INSTALLATION

A. Install insulation boards using a combination of adhesive and mechanical fasteners as recommended or approved by insulation manufacturer. Stagger vertical joints. Once insulation boards are securely attached to wall backup, apply manufacturer provided foil faced tape over all joints. Cut tape long and slit ends to lap over and around all pipes, conduits, anchor bolts or other

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items penetrating insulation boards. Cover any screw heads or other mechanical fastener heads with tape as well.

B. Install in as large of pieces as possible to minimize joints. Size to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths.

C. Use manufacturer's acceptable 4" wide aluminum foil tape to seal all:
   1. Board-to-board joints.
   2. Fastener heads

D. Use manufacturer's acceptable 6" wide aluminum foil tape to seal all:
   1. End joints.
   2. Thru-wall penetrations such as windows, doors or pipe penetrations.
   3. Joints between exterior wall insulation and adjacent air barrier materials.

E. Protect all insulation work during installation and until work is covered. Insulation which becomes compressed, displaced or otherwise damaged shall be removed and replaced with new undamaged material.

F. Notify Architect upon completion of work or portions of the work to allow inspection prior to enclosing or covering.

G. Install Batt insulation with joints butting tightly. Cut to fit around obstructions.

H. Attach to channel frame work or substrate with wire spring clips; between framing members by friction fit, and with supplementary tape or tie wire when applied in heights over 8 feet. Fit around obstructions.

I. Support for batt insulation, friction fit where the insulation stud cavity is not enclosed on both sides.
   1. Insert wires through fiberglass insulation extending from stud to stud. Wires may be installed continuously through the punch outs of the steel stud framing. Or, heavy gauge wire may be cut slightly larger than each stud space and wedged into place between studs. Where batt insulation thickness is less than the depth of the stud cavity, position wires to hold the batt against the sheathing on the opposite site of the cavity.
   2. Use of punch metal staps attached to the face of the framing. The puched pronged tabs are bent 90 degrees pointing into the stud cavity and are pushed into the insulation after installation.

PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

CLEAN UP

A. Remove all scrap materials and packaging and properly dispose of offsite.

END OF SECTION 07 21 00

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SECTION 07 26 16 – BELOW-GRADE VAPOR RETARDERS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

SECTION INCLUDES

A. Surface preparation.

B. Application of an underslab vapor retarder.

REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM E1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

2. ASTM E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.

3. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.

4. ASTM E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

5. ASTM F1249-01 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

B. American Concrete Institute (ACI)

1. ACI 302.1R-96 Vapor Barrier Component (plastic membrane) is not less than 10 mils thick.

SUBMITTALS

A. Comply with Division 1 – Submittal Procedures.

B. Submit manufacturer’s product data and application instructions.

DELIVERY, STORAGE & HANDLING

A. Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean dry area in accordance with manufacturer’s instructions.

C. Stack membrane on smooth ground or wood platform to eliminate warping.

D. Protect materials during handling and application to prevent damage or contamination.

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ENVIRONMENTAL REQUIREMENTS

A. Product not intended for uses subject to abuse or permanent exposure to the elements.

B. Do not apply on frozen ground.

PART 2 – PRODUCTS

MANUFACTURERS

A. Stego Industries, LLC (Basis of Design)
27442 Calle Arroyo, Suite A
San Yuan Capistrano, CA 92675
(877)-464-7834
Texas, Louisiana, Oklahoma
Regional Office Contact:
(281) 367-0040

B. W.R. Meadows, Inc.
P. O. Box 338
Hampshire, Illinois 60140-0338
(800) 342-5976. (847) 683-4500
Fax (847) 683-4544
Web Site www.wrmeadows.com

C. Poly-America LP
2000 West Marshall Drive,
Grand Prairie, TX 75051
(800)-527-3322 ext 7437

MATERIALS

A. Plastic Vapor Retarder

1. Performance Based Specification: Vapor Retarder membrane must meet or exceed all requirements of ASTM E1745 Classes A, B, and C.

   a. Minimum Permeance ASTM E96: 0.018 Perms
   b. Water Vapor Transmission Rate ASTM F1249 calibrated to ASTM E96 (water method): 0.007 grains/ft^2/hr
   c. Resistance to Organisms and Substrates in Contact with Soil ASTM E154, Section 13: 0.027 Perms
   d. Tensile Strength ASTM E154, Section 9: 84 LBS. Force/Inch
   e. Puncture Resistance ASTM D1709, Method B: 4,335 Grams
   f. Water Vapor Retarder ASTM E1745: Meets or exceeds Classes A, B, and C
   g. Thickness of Retarder (plastic) ACI 302.1R-96: Not less than 10 mils

2. Proprietary Based Specification

   a. "Stego-Wrap" 10 mil Class A by Stego Industries.

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b. Perminator™ 10 mil by W.R. Meadows.
c. Husky Yellow Guard 10 mil by Class A by Poly-America.

ACCESORIES

A. Seam Tape

1. High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 6 inches.
   a. Stego Crete Claw 6” tape

B. Pipe Boots and Penetrations

1. Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer’s instructions.
   a. Stego Mastic

C. Perimeter edge seal

1. High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 6 inches.
   a. Stego Crete Claw 6” tape

PART 3 – EXECUTION

EXAMINATION

A. Examine surfaces to receive membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

SURFACE PREPARATION

A. Prepare surfaces in accordance with manufacturer’s instructions.

APPLICATION

A. Installation shall be in accordance with manufacturer’s instructions and ASTM E 1643-98.

B. Unroll vapor barrier with the longest dimension parallel with the direction of the pour.

C. Lap vapor barrier over footings and seal to foundation walls.

D. Overlap joints 6 inches and seal with manufacturer’s tape.

E. Apply Crete Claw tape between seams at 42” o.c. max parallel to seams.

F. Seal all penetrations (including pipes) with manufacturer’s pipe boot.

G. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.

G. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with tape.

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END OF SECTION 07 26 16

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SECTION 07 27 20 – FLUID-APPLIED AIR BARRIER

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

A. Install one-component vapor permeable, liquid applied elastic air and water barrier.

B. Materials and installation to bridge and seal the following air leakage pathways and gaps:
   1. Connections of the walls to the roof air barrier.
   2. Connections of the walls to the foundations.
   3. Expansion joints.
   4. Openings and penetrations of window frames, store fronts, and curtain walls.
   5. Barrier precase concrete and other envelope assembly.
   6. Door frames.
   7. Piping, conduit, duct and similar penetrations.
   8. Masonry ties, screws, bolts and similar penetrations.
   9. All other air leakage pathways in the building envelope
   10. Sealing flashing to wall surface.

PERFORMANCE REFERENCES

A. Air Barrier Association of America:
   1. ABAA List of Evaluated Assemblies.

B. American Association of Textile Chemists and Colorists:
   1. AATCC 127 – Water Resistance: Hydrostatic Pressure Test.

C. ASTM International:
   1. ASTM D1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
   2. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials.
   4. ASTM E283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
   5. ASTM E331 – Standard Test Method for Structural Performance of Exterior Windows, Curtains, and Doors by Uniform Static Air Pressure Difference.
   6. ASTM E2178 – Standard Test Method for Determining the Air Permeability of Buidling Materials.
   7. ASTM E2357 – Standard Test Method for Determining Air Leakage of Air Barrier Assembly.

D. ICC Evaluation Service:
   1. ICC-ES AC212 – Water Resistive Coatings Used as Water Resistive Barrier over Exterior Sheathing.

E. Codes
   1. 2021 International Building Codes

PERFORMANCE REQUIREMENTS

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A. Provide an air barrier system constructed to perform as a continous elastic air barrier, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.
   1. The air barrier shall have the following characteristics:
      a. It must be continuous, with all joints made air-tight.
      b. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent assembly, allowing for the relative movement of assembly due to thermal and moisture variations and creep. Connection shall be made between the following:
         1) Foundation and walls
         2) Walls and windows or doors
         3) Different wall assembly
         4) Wall and roof
         5) Wall and roof over undconditioned space
         6) Walls, floor and roof across construction, control and expansion joints.
         7) Walls, floors and roof to utiltiy, pipe and duct penetrations.
         8) Flashing to wall surface.
   2. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made air-tight.
   3. Air Permeability: Maxiumum 0.04 cfm/sq.ft. @ 10.5 per ASTM E283.
   4. Air Permeability: @ delta P of 0.3 inches water..0.002 CFM/ft² per ASTM E2178.
   5. ASTM E2357, Full Scale Wall Testing of Air Barrier System.
   6. ASTM E96 Water Vapor Permeance: 10-20 Perms per Procedure B.
   7. ASTM E331, 10psf for 2 hours.
   8. Elongation: Minimum 50% per ASTM D412.
   9. AATC 127 Water Resistance –Pass
   10. ASTM D1970 Self Sealability – Pass
   11. ICC-ES AC212, Freeze, Thaw, Crack Bridging – Pass.
   12. Fire Testing: Air Barrier as a component of a wall assembly, shall have passed a NFPA 285 complete wall fire test.
   13. ASTM E84 Class A Fire Resistant.
   14. Listed as an evaluated assembly by the ABAA at www.airbarrier.org.

SUBMITTALS

A. Submit manufacturer’s independent Laboratory Report fro the Air Barrier Assembly testing on ASTM E 2357 tested on a steel stud frame wall.

B. Submit documentation certifying that the air barrier system has been tested independently, indicating compliance with the performance requirements of the Air Barrier Association of America.

C. Submit copies of manufacturer’s literature for the system, membrane, primers, sealants, adhesives and associated auxiliary materials shall be included as parts of the system that is listed by the Air Barrier Association of America.

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D. Submit manufacturer's complete stet of standard details for air barrier/vapor retarders. The manufacturer shall review the contract drawings and not any modifications required to make the system air and water tight.

QUALITY ASSURANCE

A. Manufacturer's Qualifications: Provide primary products, including each component of the air barrier membrane system, which has been commercially available for a minimum of 3 years.

B. Submit document stating that the applicator of the primary air barrier membrane specified in this section is recognized by the manufacturer as suitable for the execution of the Work.

C. Perform Work in accordance with the printed requirements of the air barrier manufacturer and this specification.

D. Maintain a copy of manufacturer instructions on site.

E. Allow access to Work site by the air barrier membrane manufacturer's representative.

PRE-INSTALLATION CONFERENCE

A. Convene four weeks prior to commencing work of this section. Attendance by the manufacturer's representative along with the installer.

B. Do not start installation of Air Barrier Membrane and Flashing prior to the Pre-Installation Meeting.

PRODUCTS

MEMBRANE

A. Liquid Air Barrier: One component elastomeric membrane, spary, trowel or brush applied, having the following characteristics and have passed all evaluations by the Air Barrier Association of America (ABAA) and be listed on their web site as having passed all the evaluations.
   1. Air Barrier Material permeablility test:
      a. Air Leakage per ASTM E2178, dry film, delta P of 0.3 inches of water, 0.002 ± 10%.
   2. Air Barrier System Test on Full Scale Wall Assembly, ASTM E2357
      a. System Air Leakage, 0.0008 CFM/ft² ± 10%
      b. Penetrations Check, Must pass ASTM E2357 requirements
   3. Water Vapor permeance: (704 ng/Pa.m2.s) 10 to 20 perms, ASTM E96 Method B.
      a. Note: Material specified is Vapor Permeable.
   4. Elongations (ASTM D412: > 50%)
   5. Low temperature flexibility and crack bridging: Pas – ICC-ES AC212
   6. ASTM D1970, Self Sealabiltiy – Pass
   7. AATCC 127 Water Resistance – Pass
   8. ASTM E84, Class A Fire Resistant
   9. Recycle content >20%

B. Acceptable Manufacturers:
   1. STS Coating, Wall Guardian, 830-995-5177, www.wallguardian.com.
      a. FW-100A, a non-asphaltic product.
   2. Carlisle Coatings & Waterproofing, 800-527-7092, www.carlisleccw.com

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   a. Barritech VP, a non-asphaltic product
3. Sika-Sarnafil, 201-933-8800, www.sikausa.com
   a. Sikaguard 530, a non-asphaltic product.

C. Transition Membrane, Self-Adhering: Polimer-based, sheet membrane complete with polyester facing, and having the following physical properties:
   1. Thickness: 35 mils (0.5 mm) min.
   2. Vapor permeance: <0.1
   3. Low temperature flexibility: -20 F to CGSB 37-GP-56M;
   4. Elongation: >90% to ASTM D412-modified
   5. ASTM E331, 10psf for 2 hours
      a. Acceptable Material:
         1) UT-40 by STS Coatings for use with the FW-100 system.
         2) Others as recommended by approved manufacturer.

D. Contractor Qualifications:
   1. Contractor shall provide a manufacturer's letter stating that they have been trained and are approved to apply the manufacturer's air barrier.
   2. An ABAA Certified Contractor, specific certification for liquid applied and approved by letter from the manufacturer.

PRIMER

A. Primer for self-adhering membranes: Synthetic polymer-based adhesive type, quick setting, having the following characteristics:
   1. Acceptable material: As manufactured and / or recommended by the Air Barrier System manufacturer. Note: Primer shall be compatible with specified exterior gypsum sheathing.
   2. Verify compatibility of self-adhering membranes with perservative treated materials specified in Section 6. Prime perservative treated materials as required using primer recommended by self-adhering membrane manufacturer or use the non-chemical thermally modified wood known as EcoPrem.

SEALANTS

A. Sealants shall be compatible with air barrier assembly and shall be approved by the air barrier manufacturer.

B. Products:
   1. STS Coatings LT-100 Liquid Tape for concealed applications only and Great Seal PE-150 for concealed and exposed applications.

C. Primers: As recommended by manufacturer for surfaces to be sealed.

D. Backer Rods: As recommended by sealant manufacturer.

EXAMINATION

A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify Architect in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrate.

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PREPARATION

A. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrates to provide an even plane.

B. Mortar joints in concrete block and form tie holes/voids in poured concrete shall be filled flush and smooth and allowed to be cured for a minimum of 24 hours.

C. All joints between gypsum sheathing, roof board, masonry and concrete and other substrate joints up to 1/4" wide shall be treated.
   1. STS Coatings LT-100 Liquid Tape, www.stscoatings.com
   2. Others as recommended by approved manufacturer.

D. All joints between gypsum sheathing, roof board, masonry and concrete and other substrate wider than 1/4" shall be sealed with:
   1. UT-40, overlapping each side of joint a minimum of 3 inches.
   2. Others as recommended by approved manufacturer.

E. Install backer rod and sealant at the following joints:
   1. All expansion/control/erection joints between concrete wall panels.
   2. All expansion/control joints in concrete block back-up.
   3. All joints between concrete wall panels and concrete block back-up.

TRANSITION MEMBRANE (SELF-ADHERING TYPE ONLY)

A. Primer:
   1. Apply primer for self-adhering membranes at rate recommended by manufacturer.
   2. Apply primer to all areas to receive transition sheet membrane as indicated in Drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by transition membrane during the same working day must be re-primed.

B. Membrane:
   1. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps unless otherwise noted.
   2. Tie-in to roofing system and at the interface of dissimilar materials as indicated on Drawings.
   3. Promptly roll all laps and membrane with a counter top roller to affect seal.
   4. Ensure all preparatory work is complete prior to applying liquid membrane.

PRIMARY AIR BARRIER

A. Apply by spray or roller, a complete and continuous unbroken film at an ambient and substrate surface temperature of 40°F and rising with less than a 30% chance of rain in the next 18 hours and apply at the same rate as listed in the Air Barrier Association of America evaluation.
   1. Exterior Gypsum Sheathing, Plywood or OSB.
      a. Wall Guardian FW-100A at a minimum of 2.5 gallons per 100ft² (40 ft²/gallon) (40 wet mils)
      b. Others meeting stated ABAA approval converage rates.
      c. Spray around all projections, including masonry veneer anchors, ensuring a complete and continuous air seal.
   2. Concrete Masonry Unit (CMU) Concrete
      a. Wall Guardian FW-100A at a minimum of 2.5 gallons per 100 ft² (40ft²/gallon) (equal to 40 wet mils on a smooth surface)

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b. Others meeting state ABAA approval coverage rates.
c. Spary around all projections including masonry veneer anchors ensuring a complete and continuous air seal.

INSPECTION

A. Notify Architect when sections of work are complete so as to allow for review prior to installing insulation. The manufacturer's representative shall be on site to review the installation.

PROTECTION

A. Cover the liquid membrane as recommended by the manufacturer, within the following time frames. Contractor shall verify the number of calendar days with the air barrier manufacturer.
   1. Cover the Wall Guardian material within 180 calendar days after installation. The nature of this product is such that some surface weathering may become apparent during exposure.

B. Prepare, treat and seal vertical and horizontal surfaces at terminations and penetrations through air barrier an dat protrusions according to the air barrier manufacturer's written instructions.

SCHEDULE

A. Install liquid membrane system over the entire suface of the exterior sheathing in the following area. Seal any masonry anchor penetrations air tight.

B. Install liquid membrane system over the entire surface of the outer surface of the inner wythe of masonry. Seal any masonry anchor penetrations air tight.

C. Install liquid membrane sytem over the entire surface of outer surface of concrete wall panels. Seal any masonry anchor penetrations air tight.

D. Install liquid membrane system over the entire surface of the exterior gypsum sheathing and /or roof board in the following area:
   1. Parapets
   2. Behind all wall veneers and soffit panels

E. Hollow Metal Door Frames: Seal door frame to wall surface with transition membrane.

F. Wall and Roof Junction: Seal wall to roof with transition membrane.

G. Seal joints in exterior sheathing with tape in the following areas:
   1. Walls
   2. Soffit Areas

H. Seal the top of sheathing to the underside of the roof assembly with foam or LT-100.

I. Openings: Seal around the perimeter of all openings with transition membrane.

J. Perimeter wood nailers as wall openings: Cover all exposed surfaces of wood nailers with transition membrane. Extend membrane over sheathing, masonry and metal framing as shown.

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K. Aluminum window frames and nailing flanges. Seal the nailing flange to the wall surface with transition membrane.

L. Aluminum window frames without nailing flanges: Seal frames to the wall surface with transition membrane.

M. Aluminum storefront frames: Seal frames to the wall surface with transition membrane.

END OF SECTION 07 27 20

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SECTION 07 61 13 – STANDING SEAM METAL ROOF PANELS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes standing-seam metal roof panels.

B. Related Sections:
   1. Section 07 42 13 "Metal Wall Panels" for metal panels used in horizontal soffit applications.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at [Project site] <Insert location>.
   1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof accessories and roof-mounted equipment.
   2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
   4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
   5. Review structural loading limitations of deck during and after roofing.
   6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
   7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
   8. Review temporary protection requirements for metal panel systems during and after installation.
   9. Review procedures for repair of metal panels damaged after installation.
   10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:
   1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
   2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 3 inches per 12 inches (1:5).

C. Calculations:

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1. Include calculations with registered engineer seal, verifying roof panel and attachment method resist wind pressures imposed on it pursuant to applicable building codes.

D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied color finishes.
   1. Include similar Samples of trim and accessories involving color selection.

R. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
   1. Metal Panels: 12 inches (305 mm) long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Manufacturer and Installer.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in architectural sheet metal products.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels until installation. Remove as panels are being installed. Verify film is not left on installed panels.

1.8 FIELD CONDITIONS

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A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

A. Special Galvalume Substrate Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, or perforating.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: 20 years and 6 months from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, chipping, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to [ASTM E 1592] [UL 580]:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: [As indicated on Drawings] <Insert loads>.
   3. Deflection Limits: For wind loads, no greater than [1/180] [1/240] <Insert deflection> of the span.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 1680 and ASTM E 283 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 and ASTM E 331 at the following test-pressure difference:
   1. Test-Pressure Difference: 15 lbf/sq. ft. (718.2 Pa).

D. Hydrostatic Head Resistance: No water penetration when tested according to ASTM E2140.

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E. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
   1. Uplift Rating: UL 90.

2.2 STANDING-SEAM METAL ROOF PANELS

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
   1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.

B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels (MR-1): Formed with vertical ribs at panel edges and panel striations between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Berridge Manufacturing Company; Double-Lock Zee-Lock (180o Seam) or comparable product by one of the following:
      a. Architectural Building Components/McElroy; Maxima
      b. Fabral Wall and Roof Systems; Double Locked PowerSeam
      c. MBCI; “Superlok 216”
      d. Peterson Aluminum Corp.; Tite-Loc Plus
      e. Substitutions: See Section 01 25 00 – Substitution Procedures.

   2. Metallic-Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
      a. Nominal Thickness: 0.024 inch (0.61 mm)
      b. Exterior Finish: Two-coat fluoropolymer.
      c. Painted materials shall have a removable plastic film to protect the paint during roll forming, shipping and handling.
      d. Color: As selected by Architect from manufacturer's full range.
   3. Clips: Continuous Zee-rib to accommodate thermal movement.
      a. Material: 0.024-inch (0.61-mm) nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
   4. Joint Type: Double folded.
   5. Panel Coverage: 16 inches (406 mm).
   6. Panel Height: 2.0 inches (51 mm).

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 40 mils (1.02 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
   1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
   2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
   3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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a. Grace Ultra
b. Mid-States Asphalt Quick Stick HT Pro
c. Polyglass Polystick MTS
d. Soprema Lastobond Shield HT
e. Grace Ice & Watershield HT

2.4 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
   2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch (2400-mm) long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches (914 mm) o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match [metal roof panels] [roof fascia and rake trim].

E. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot (3-m) long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Finish downspouts to match gutters.

F. Roof Curbs: Fabricated from same material as roof panels, [0.024 inch (0.61 mm)] [0.029 inch (0.74mm)] nominal thickness; galvalume or stainless steel; supply an integral full-length cricket for curbs wider than 24 inches (610 mm) supported by a structural metal deck. Fabricate curb flashing from [0.024 inch (0.61 mm)] [0.029 inch (0.74mm)]. On open framing, provide roof underlayment and decking at and about roof curb per roofing manufacturer’s requirements. Maintain a minimum of 1/2 of roofing panel width on each sideof roof curb, and start panels a minimum of 9 inches (229 mm) up slope of roof curb, flashing roofing panels to roof curb per roofing manufacturer’s requirements.. Fabricate curb and subframing to withstand indicated loads of size and height of roof top equipment. Where required insulate roof curbs with rigid insulation.

G. Panel Fasteners: Zinc-coated steel, corrosion resisting steel, zinc cast head, or nylon capped steel, type and size as approved for the applicable loading requirements.

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H. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
   1. Joint Sealant: Silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.

2.5 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using factory set, non-adjustable, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   3. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

2.6 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Steel Panels and Accessories:
   1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat applied by panel manufacturer on a continuous coil coating line, with a top side dry film thickness of 0.75± 0.05 mil (0.0013 mm) over 0.2± 0.05 mil (0.0013 mm) primer coat, to provide a total dry film thickness of 0.95± 0.10 mil (0.024 mm). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

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2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.35 mil (0.009 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
   1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
   2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
      a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 36 inches (914.4 mm). Roll laps with roller. Cover underlayment within 14 days or as directed by the underlayment product manufacturer.
   12. At minimum apply over the roof area indicated below:
      a. Roof perimeter for a distance up from eaves of 24 inches (610 mm) beyond interior wall line.
      B. Rake edges for a distance of 18 inches (460 mm).

C. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 07 62 00 "Sheet Metal Flashing and Trim."

3.4 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

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1. Shim or otherwise plumb substrates receiving metal panels to be level to 1/4 inch in 20 ft. (6 mm in 6.1 m).
2. Flash and seal metal panels at perimeter of all openings. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Locate and space fastenings in uniform vertical and horizontal alignment.
4. Install flashing and trim as metal panel work proceeds.
5. Panels should be continuous without end laps.
6. Align bottoms of metal panels and fasten.
7. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:
   1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
   1. Install clips to supports with self-tapping fasteners.
   2. Install pressure plates, if required, at locations indicated in manufacturer's written installation instructions.
   3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel are completely engaged.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

H. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches (914 mm) o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

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I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1524 mm) o.c. in between.
   1. Provide elbows at base of downspouts to direct water away from building.
   2. Connect downspouts to underground drainage system indicated.

J. Roof Curbs: Install flashing around bases where they meet metal roof panels.
K. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof panel installation, including accessories. Report results in writing.

B. Remove and replace applications of metal roof panels where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

3.7 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 41 13

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SECTION 07 42 13 – METAL WALL AND SOFFIT PANELS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Concealed-fastener, lap-seam metal wall and soffit panels.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
   2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
   4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
   5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
   6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
   7. Review temporary protection requirements for metal panel assembly during and after installation.
   8. Review of procedures for repair of metal panels damaged after installation.
   9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:
   1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
   2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 3" = 1'-0" (1:5).

D. Calculations:
   1. Include calculations with registered engineer seal, verifying wall panel and attachment method resist wind pressures imposed on it pursuant to applicable building codes.

E. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.
   1. Include Samples of trim and accessories involving color selection.

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1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and Manufacturer.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Manufacturer Qualifications: Company specializing in Architectural Sheet Metal Products.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Remove strippable protective covering on metal panels as panels are being installed. Do not leave the film on installed panels.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

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A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Galvalume Substrate Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing or perforating.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: 20 years and 6 months from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, chipping, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
   1. Wind Loads: As indicated on Drawings.
   2. Deflection Limits: For wind loads, no greater than [1/180] [1/240] <Insert deflection> of the span.

C. Air Infiltration: Air leakage of not more than 0.01 cfm/sq. ft. (0.05 L/s per sq. m) tested according to ASTM E 283 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa)

D. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
   1. Test-Pressure Difference: 15 lbf/sq. ft. (718.2 Pa)

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Wide-Reveal-Joint, Concealed-Fastener Metal Wall Panels <Insert drawing designation>: Formed with [vertical] [horizontal] panel edges and a stepped profile between panel edges, resulting in a wide reveal joint between panels.

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1. Basis-of-Design Product: Subject to compliance with requirements, provide Berridge Manufacturing Company; **HR-4**, **HS-8** and **HR-16**:
2. Metallic-Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   a. Nominal Thickness: [0.024 inch (0.61 mm)]
   b. Surface: Smooth finish.
   c. Exterior Finish: Two-coat fluoropolymer
   d. Color: As selected by Architect from manufacturer's full range.
4. Panel Coverage: 4 inches (102 mm), 8 inches (203 mm) and 16 inches (406 mm)
5. Panel Height: 0.875 inches (22 mm).

2.3 CONCEALED-FASTENER, LAP-SEAM METAL SOFFIT PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Flush-Profile, Concealed-Fastener Metal Soffit Panels <Insert drawing designation>: Formed with vertical panel edges and [intermediate stiffening ribs symmetrically spaced] [a flat pan] [vented] between panel edges; with flush joint between panels.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Berridge Manufacturing Company; **L-Panel** or comparable product by one of the following:

2. Metallic-Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   a. Nominal Thickness: 0.024 inch (0.61 mm)
   b. Surface: Smooth, flat finish.
   c. Exterior Finish: Two-coat fluoropolymer
   d. Color: As selected by Architect from manufacturer's full range.
3. Panel Coverage: 11.625 inches (296 mm)
4. Panel Height: 1.0 inch (25 mm)

2.4 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 40 mils (1.02 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Grace Ultra
      b. Mid-States Asphalt Quick Stick HT Pro
      c. Polyglass Polystick MTS
      d. Soprema Lastobond Shield HT
      e. Tamko TW Underlayment or TW Metal & Tile Underlayment
      f. <Insert manufacturer’s name>.
   2. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.

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3. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.

B. Felt Underlayment: ASTM D 226/D 22M, Type II (No. 30), asphalt-saturated organic felts.

2.5 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275) hot-dip galvanized coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
   2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
   1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
   2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
   3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.6 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

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B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
   4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.7 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Steel Panels and Accessories:
   1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat applied by panel manufacturer on a continuous coil coating line, with a top side dry film thickness of 0.75± 0.05 mil (0.019± 0.0013 mm) over 0.2± 0.05 mil (0.05± 0.0013 mm) primer coat, to provide a total dry film thickness of 0.95± 0.10 mil (0.024± 0.0025 mm). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.35 mil (0.009 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

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A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
   1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
   2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
      a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Shim or otherwise plumb substrates receiving metal panels.
   2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
   3. Install screw fasteners in predrilled holes.
   4. Locate and space fastenings in uniform vertical and horizontal alignment.
   5. Install flashing and trim as metal panel work proceeds.
   6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
   7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
   8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:
   1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

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1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

E. Watertight Installation:
   1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
   2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
   3. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
   1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.4 FIELD QUALITY CONTROL

A. Testing Agency: [Owner will engage] [Engage] a qualified testing agency to perform tests and inspections.

B. Water-Spray Test: After installation, test area of assembly [shown on Drawings] [as directed by Architect] <Insert area> for water penetration according to AAMA 501.2.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.

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D. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.

E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 42 13

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SECTION 07 54 19 – POLYVINYL-CHLORIDE (PVC/TPA) ROOFING, WOOD DECK

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Adhered thermoplastic PVC roofing system on wood deck, including:
   2. Roof insulation.
      a. Polyisocyanurate roofing insulation (as indicated on plans), as required to provide positive drainage with NO PONDING. Provide for continuous insulation of 2” on sloped roof deck.
      b. Polyisocyanurate roofing insulation crickets & saddles (as indicated on plans), 1/2" per foot slope or as required to provide positive drainage with NO PONDING.
      c. One (1) layer of 1/2" thick high performance gypsum-fiber roof cover board.
   3. Roof membrane and membrane base flashings.
      a. One (1) ply of PVC/TPA fleece backed membrane adhered in cold adhesive with health welded laps, corners, and terminations.
   4. Walkway material.

B. Related Sections:
   1. Division 07 Section "Sheet Metal Flashing and Trim" for shop-formed sheet metal items including roof drainage system items, roof penetration flashings, base and counterflashings and reglets, and formed copings and roof edge metal items.

1.2 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.
   1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review drawings and specifications.
   3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
   6. Review structural loading limitations of roof deck during and after roofing.
   7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
   8. Review governing regulations and requirements for insurance and certificates if applicable.
   9. Review temporary protection requirements for roofing system during and after installation.
   10. Review roof observation and repair procedures after roofing installation.

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1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Product Certificate: Submit certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.

B. Qualification Data: For Installer, Manufacturer and Roofing Inspector.
   1. Include letter from Manufacturer written for this Project indicating approval of Installer.

C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of compliance with performance requirements.
      a. Include: UL listing certificate.
   2. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives, and sealants.

D. Warranties: Unexecuted sample copies of special warranties.

E. Inspection Reports: Reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.

1.6 CLOSEOUT SUBMITTALS

A. Executed copies of warranties.

B. Maintenance Data: To include in maintenance manuals.

1.7 SUBSTITUTIONS

A. General:
   1. ONLY Substitutions approved in writing by the Owner or Owner’s Representative prior to the scheduled bid date will be considered.
   2. Notification of approvals will be issued at least five (5) days before the scheduled bid date.
   3. Architect/Owner reserves the right to be final authority on acceptance or rejection of any substitution request.

B. When a particular make or trade name is specified, it shall be indicative of standard required. Bidders proposing substitutes shall submit the following ten (10) days prior to bid date to the Owner or Owner’s Representative; requests received after that time will not be considered.
   1. Written application with explanation of why it should be considered.
   2. Independent laboratory certification providing written confirmation that the physical and performance characteristics of the substitute material/system will meet the physical and performance characteristics of the specified materials and or system.

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C. Submit five copies of request for substitution. Items to be included in the request:
   1. Complete data substantiating compliance of proposed substitution.
   2. Product identification, including manufacturer's literature and manufacturer's name.
   3. Current certificate from an accredited testing laboratory comparing the physical and performance attributes of the proposed material with those of the specified materials. Test results must be dated, notarized, and on testing laboratory stationary.
   4. Material Safety Data Sheets providing all pertinent data as to flammability, combustibility.
   5. List of at least (5) five jobs as described under the requirements where the proposed alternate material was used under similar conditions. These jobs must be available for inspection by the Owner or Owner's Representative. Names and phone numbers are required for verification. Submit a minimum of 200,000 square feet for review. Submitted projects must be a minimum of (5) years old.
   6. Notarized statement from the Roof System Manufacturer, signed by a corporate officer of the corporation stating that:
      a. All Documents have been reviewed and are approved.
      b. The Project site has been inspected.
      c. The Roofing System Manufacturer will provide two (2) field inspections weekly; during, and until all construction work is complete and accepted by the owner. A full time employee of the manufacturer must perform inspections.
      d. Provide documentation of the proposed alternate system passing the specified regulatory requirements. Documentation must be on the specified regulatory requirements letterhead or approval guide. No third party testing will be accepted.

D. In making substitution request, Bidder/Contractor represents:
   1. He has personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified. Additionally, he will have a technical service representative of the proposed manufacturer attend the pre-bid meeting.
   2. He will provide the same guarantee for substitution as for those specified.
   3. He will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
   4. Advise the owner of any credit savings or additional costs as opposed to the system type specified.

E. Substitutions will not be considered if:
   1. Product or method to be considered does not have a minimum of (5) five years of successful performance in roofing and re-roofing of similar applications.
   2. Any discrepancies in the test data, or if the tests or submittals are incomplete.
   3. They are indicated or implied on Shop Drawings or Project Data Submittals without formal request submitted in accordance with the specification document.
   4. Acceptance requires significant revision of documents.
   5. Only substitutes approved in writing by prior to scheduled cutoff date will be considered.
   6. Notification of approvals will be mailed at least 3 days before bid opening.
   7. The Owner will not incur any additional costs for design or construction costs.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.

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B. Manufacturer Qualifications: Approved manufacturer listed in this Section, UL listed for roofing systems comparable to that specified for this Project, with minimum five years' experience in manufacture of thermoplastic roof membrane products in successful use in similar applications.

C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
   1. An authorized full-time technical employee of the manufacturer.

D. Random Sampling
   1. During course of work, the Architect may secure samples according to ASTM D140-93 of materials being used from containers at job site and submit them to an independent laboratory for comparison to specified material.
   2. Should test results prove that material is not equal to specified material:
      a. Contractor shall pay for all testing.
      b. Roofing installed and found not to comply with the specifications shall be removed and replaced with no change in the contract price.
   3. Installation quality control
      a. The roofing inspector shall provide written and photographic reports, to be submitted to the architect, owner, roof system installation contractor, appraising the installation of the roof system at each of the project progress stages. The installation contractor shall make all necessary corrections, additions or remedial actions to resolve any issues raised in the reports.
      b. The roofing inspector shall have the authority to have any and all roofing work corrected, as required, to insure the proper installation and weather-tightness of the roof system, in accordance with the manufacturer's specifications.

E. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written recommendations and instructions for installation of products.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.10 PROJECT / FIELD CONDITIONS

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A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
   1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
   2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
   3. Remove temporary plugs from roof drains at end of each day.
   4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.11 WARRANTY

A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.
   1. Form of Warranty: Manufacturer's standard warranty form.
   2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
   3. Warranty Period: 15 years from date of completion.

B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
   1. Inspections to occur in following years: 2, 5 and10 following completion.

C. Installer Warranty: Installer's warranty signed by Installer, as follows.
   1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
   2. Scope of Warranty: Work of this Section.
   3. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: The roof system specified in this Section is based upon products of Tremco CPG Inc, Beachwood, OH, (800) 562-2728, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products.
   1. Manufacturers of comparable products: Approved by Architect prior to bid.

B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Wind uplift Compliance: Provide roofing membrane, base flashing, and component materials that comply with the requirements to acquire a certificate of wind storm from the State of Texas. Basis of Compliance: NEMO Evaluation Report NER-TRM-002 for FL16425-R8 Construction W-69. IT

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IS THE CONTRACTORS RESPONSIBILITY TO READ AND FOLLOW THE PROVIDED TESTED ASSEMBLY. A LIST OF THE BASIS OF DESIGN ASSEMBLIES MAY BE LOCATED FROM THE FBC WEBSITE OR THE SYSTEM MANUFACTURER.

B. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
   1. Accelerated Weathering: Roofing system shall withstand 10,000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
   2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency in accordance with ANSI/FM 4474, UL 580, or UL 1897, and to resist uplift pressures calculated in accordance with ASCE-7 and applicable code.
   1. All Zones (Corner, Perimeter, and Field-of-Roof) Uplift Pressures: As indicated on Drawings. Verify specified system meets all uplift requirements with project engineer prior to installation.

D. SPRI Wind Design Standard: Manufacture and install copings and roof-edge flashings tested according to ANSI/SPRI ES-1.
   1. Design Pressure: As indicated on Drawings. Verify installation methods are acceptable to project windstorm engineer prior to installation.

E. Flashings and Fastening: Comply with requirements of Division 07 Sections “Sheet Metal Flashing and Trim” and “Roof Specialties.” Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
   1. FM Global 1-49: Loss Prevention Data Sheet for Perimeter Flashings.
   2. FM Global 1-29: Loss Prevention Data Sheet for Above Deck Roof Components.
   3. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
   4. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
   5. Comply with requirements of Division 07 Section "Sheet Metal Flashing and Trim".

F. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

G. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E1980, based on testing identical products by a qualified testing agency.

2.3 MATERIALS, GENERAL

A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

2.4 THERMOPLASTIC MEMBRANE MATERIALS

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A. PVC Roof Membrane:
   1. Thermoplastic PVC/TPA sheet, internally fabric reinforced and fleece backed, Energy Star qualified, CRRC listed, and California Title 24 Energy Code compliant, ASTM D4434 Type IV.
   a. Basis of design product: Tremco, TPA FB Single Ply Roof Membrane.
   b. Tensile Strength at 0 deg. F (-18 deg. C), minimum, ASTM D751: 350 lbf/in (1550 N).
   c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D751: 100 lbf (440 N).
   d. Elongation at 0 deg. F (-18 deg. C), minimum at fabric break, ASTM D751: 35 percent machine direction, 33 percent cross-machine direction.
   e. Minimum Thickness, nominal, ASTM D751: 0.060 in (1.5 mm).
   f. Color: White.
   g. Solar Reflectance Index (SRI), ASTM E1980: 108 (White, initial); 84 (White, 3-year aged).
   h. Recycled Content, minimum: 25 percent pre-consumer.

B. Membrane Flashing: Manufacturer's standard, smooth-backed, sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.

2.5 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Membrane Adhesive:
   1. Cold-applied bio-based low odor urethane roofing adhesive, two-part, USDA BioPreferred, formulated for compatibility and use with specified roofing membranes and flashings.
      a. Basis of design product: Tremco, POWERply Endure BIO Adhesive TF.
      b. Volatile Organic Compounds (VOC), maximum, ASTM D3690: 0 g/L.
      c. Low Temperature Flexibility, ASTM D2240: Pass at -30 deg F (-34 deg C).
      d. Solids, by Volume, ASTM D2697: 100 percent.
      e. Biobase Content, Minimum, ASTM D6866: 70 percent.

C. Flashing Membrane Adhesive:
   1. Elastomeric solvent-based contact-type adhesive for bonding TPA fleece-backed and non-fleece-backed single ply membranes and flashings to substrates.
      a. Basis of design product: Tremco, TPA Single Ply Bonding Adhesive.
      b. Density at 77 deg. F (25 deg. C), minimum, ASTM D147: 7.0 lb/gal (0.84 kg/L).
      c. Percent solids, minimum ASTM D316: 25 percent.
      d. VOC, maximum, ASTM D 3960: 612 g/L.

D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors.

E. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to membrane roofing system manufacturer.

F. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.
   1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.

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a. Basis of design product: Tremco, TremSEAL Pro.
b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
c. Hardness, Shore A, ASTM C661: 40.
d. Adhesion to Concrete, ASTM C794: 35 pli.
e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
f. Color: Closest match to substrate.

G. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."
1. Vents and/or Stacks:
a. Stainless: Type 316.
b. Gage: Twenty-four (24).
c. Solder: ASTM B32-89, alloy grade 60A. Neutralize flux after soldering.
2. Termination Bar for top edge of all base flashings:
a. Extruded aluminum, pre-punched 8” o.c.
3. Fascia, Pitch Pans, Primary Scuppers and Overflow Scuppers:
a. TPA membrane factory laminated to hot-dipped galvanized steel. 24gauge, G90 hot dipped galvanized steel, cack wash coat of 0.0001” clear acrylic, laminated on one side with 20 mil unreinforced TPA membrane.
4. Coping, Collector Heads, Gutters, Downspouts, designated cladding and other Visible Sheet Metal Flashing: Match existing size, profile and location.
a. Galvalume, Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340), prepainted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.
1) Paint finish at exposed side: Factory applied baked-on two (2) coat system comprised of one (1) coat of full 70% resin fluorocarbon by Kynar 500 or accepted substitute over a smooth coat of corrosion-resistant epoxy-based primer. Color as selected by owner.
2) Finish at underside shall be a wash coat over a coat of corrosion-resistant epoxy-based primer
5. Counter flashing, slip flashing:
a. Galvalume, Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340), prepainted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.
b. Gage: Twenty-four (24)
6. Pitch pans with hoods:
a. Stainless Steel, Type 304: Twenty-four (24) gauge minimum, stainless steel; commercial quality, Fed. Spec. QQ-S-775, Type I, Class D or ASTM A 526 or lock forming quality ASTM A 527, G90 coating in accordance with ASTM A 525
7. Roof top splash pans.
a. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface, .040-.050, with water slowing ridges.
b. Stainless Steel, Type 316. Twenty-four (24) gauge minimum, stainless steel; commercial quality, Fed. Spec. QQ-S-775, Type I, Class D or ASTM A 526 or lock forming quality ASTM A 527. Fabricate with water slowing ridges.
c. Concrete splash pads at ground level: Refer to drawings for size and detail

H. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

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1. Roof Drain & Scupper Target Striping: Polyurethane Elastomeric Fluid-Applied System: Two-coat fluid-applied roofing membrane formulated for application over prepared existing roofing substrate.
   a. Basis of design product: Tremco, AlphaGuard BIO Top Coat.
2. Roof Drain & Scupper Target Primer: Polyurethane Elastomeric Fluid-Applied System: Single component primer designed to enhance adhesion to approved substrates and applications of urethane based products.
   a. Basis of design product: Tremco, Geogard Primer.
3. Roof Drain & Scupper Target Striping: Polyester Reinforcing and Protection Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings and as a protection layer under pavers or stone aggregates.
   a. Basis of design product: Tremco, Permafab.

I. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.6 ROOF INSULATION MATERIALS

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from insulation manufacturer's standard sizes, suitable for application, and of thicknesses indicated.
   1. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated, not less than two times the roof slope.

B. Roof Insulation: Provide roof insulation product in thicknesses indicated in Part 3 as follows:
   1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.
      a. Basis of design product: Tremco, Trisotech Insulation.
      b. Compressive Strength, ASTM D1621: Grade 2: 20 psi (138 kPa).
      c. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.
      d. Available manufacturer's:
         1) Tremco
         2) Atlas AC Foam II

2.7 ROOF INSULATION ACCESSORIES

A. Cover Board:
   1. Gypsum panel, glass-mat-faced, primed, ASTM C1177/C1177M.
      a. Basis of design product: Tremco/SECUROCK.
      b. Thickness: 1/2 inch (12 mm).

B. Roof Insulation Adhesive:
   1. Urethane adhesive, bead-applied, low-rise two-component solvent-free low odor, formulated to adhere roof insulation to substrate.
      a. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive.

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b. Flame Spread Index, ASTM E84: 10.
c. Smoke Developed Index, ASTM E84: 30.
d. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.
e. Tensile Strength, minimum, ASTM D412: 250 psi (1720 kPa).
f. Peel Adhesion, minimum, ASTM D903: 17 lbf/in (2.50 kN/m).
g. Flexibility, 70 deg. F (39 deg. C), ASTM D816: Pass.
h. Available Manufacturer's:
    1) Tremco
    2) Royal

C. Insulation Cant Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

D. Tapered Edge Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

2.8 WALKWAY MATERIALS

A. Walkway Material:
1. Walkway roll, reinforced PVC/TPA membrane roll with serrated slip-resistant surface, fabricated for heat welding to compatible PVC/TPA membrane surface.
    a. Basis of design product: Tremco, TPA Walkway Roll.
    b. Roll Size: 36 inches by 60 foot (914 mm by 18.3 m).
    c. Thickness / Color: Yellow, 0.156 inch (4 mm).
    d. Tensile, Grab ASTM D751: 200 lbf (890 N).
    e. Tear Strength, Tongue : 45 lbf (200N).
    f. Low Temp Flex: -40 deg F. (-40 deg C.).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Wood Roof Deck: Verify that deck is sound and dry and securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
4. Verify that existing substrate is sound and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

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C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION, GENERAL

A. Install roofing system in accordance with manufacturer's written instructions and approved details.

B. NRCA Installation Details: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations; modify as required to comply with manufacturer's approved details and perimeter fastening requirements of FM Global references if applicable.

3.4 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Tapered Insulation, Drains, and Crickets: Install tapered insulation under area of roofing to conform to slopes indicated.
   1. Where crickets are indicated or required to provide positive slope to drain, make slope of crickets minimum of two times the roof slope, not less than 1/4 inch in 12 inches (1:48).

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (70 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
   1. Flat Insulation System on Sloped Roof Deck: Install insulation at minimum thickness as follows:
      a. Minimum total thickness of Continuous Insulation: 2.0 inches.

E. Insulation Drain Sumps: Tapered insulation sumps, not less than 2 by 2 ft. (600 by 600 mm), sloped to primary roof drain; sump to maximum depth of not more than 1 inch (25 mm) less than the Project-stipulated continuous insulation thickness based upon code requirements.

F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
   1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

H. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
   1. Prime substrate with primer as recommended by manufacturer and allow to dry.
   2. Set each layer of insulation in continuous ribbons of bead-applied insulation adhesive at 12" o.c., firmly pressing and maintaining insulation in place.

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I. Cover Boards: Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.
   1. Adhere cover boards by setting in ribbons of continuous bead-applied insulation adhesive at 6" o.c., firmly pressing and maintaining cover board in place.

3.5 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Urethane Adhesive, Ribbon-Applied for Fleece-Backed Membranes: Apply to substrate at adhesive bead size and spacing required by manufacturer for wind uplift performance requirements. Apply at not less than 1/4 inch (6 mm) wide adhesive bead at 12 inches (300 mm) oc. Roll membrane in wet adhesive. Do not apply adhesive to splice area of membrane.

E. 2-part urethane Bonding Adhesive: Apply to substrate at rate required by manufacturer. Install membrane immediately into adhesive, avoiding any air entrapment; do not allow adhesive to dry. Roll membrane into wet adhesive. Do not apply adhesive to splice area of membrane. Do not apply adhesive to splice area of membrane.

F. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.

G. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

H. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
   1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
   2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
   3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

I. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

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C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Seal top termination of base flashing with a metal termination bar and a continuous bead of joint sealant.

3.7 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

A. Roofing Inspector: Owner will engage a qualified roofing inspector to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 54 19

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SECTION 07 54 20 – POLYVINYL-CHLORIDE (PVC/TPA) ROOFING, STEEL DECK

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Adhered thermoplastic PVC roofing system on metal deck, including:
   2. Roof insulation.
      a. Polyisocyanurate roofing insulation (as indicated on plans), as required to provide positive drainage with NO PONDING. Provide for continuous insulation of 4.5” on sloped roof deck.
      b. Polyisocyanurate roofing insulation crickets & saddles (as indicated on plans), 1/2" per foot slope or as required to provide positive drainage with NO PONDING.
      c. One (1) layer of 1/2" thick high performance gypsum-fiber roof cover board.
   3. Roof membrane and membrane base flashings.
      a. One (1) ply of PVC/TPA fleece backed membrane adhered in cold adhesive with health welded laps, corners, and terminations.
   4. Walkway material.

B. Related Sections:
   1. Division 07 Section "Sheet Metal Flashing and Trim" for shop-formed sheet metal items including roof drainage system items, roof penetration flashings, base and counterflashings and reglets, and formed copings and roof edge metal items.

1.2 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.
   1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review drawings and specifications.
   3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
   6. Review structural loading limitations of roof deck during and after roofing.
   7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
   8. Review governing regulations and requirements for insurance and certificates if applicable.
   9. Review temporary protection requirements for roofing system during and after installation.
   10. Review roof observation and repair procedures after roofing installation.

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1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Product Certificate: Submit certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.

B. Qualification Data: For Installer, Manufacturer and Roofing Inspector.
   1. Include letter from Manufacturer written for this Project indicating approval of Installer.

C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of compliance with performance requirements.
      a. Include: UL listing certificate.
   2. Product Compatibility: Indicate manufacturer has verified compatibility of roofing system components, including but not limited to: Roofing membrane, flashing sheets, adhesives, and sealants.

D. Warranties: Unexecuted sample copies of special warranties.

E. Inspection Reports: Reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.

1.6 CLOSEOUT SUBMITTALS

A. Executed copies of warranties.

B. Maintenance Data: To include in maintenance manuals.

1.7 SUBSTITUTIONS

A. General:
   1. ONLY Substitutions approved in writing by the Owner or Owner’s Representative prior to the scheduled bid date will be considered.
   2. Notification of approvals will be issued at least five (5) days before the scheduled bid date.
   3. Architect/Owner reserves the right to be final authority on acceptance or rejection of any substitution request.

B. When a particular make or trade name is specified, it shall be indicative of standard required. Bidders proposing substitutes shall submit the following ten (10) days prior to bid date to the Owner or Owner’s Representative; requests received after that time will not be considered.
   1. Written application with explanation of why it should be considered.
   2. Independent laboratory certification providing written confirmation that the physical and performance characteristics of the substitute material/system will meet the physical and performance characteristics of the specified materials and or system.

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C. Submit five copies of request for substitution. Items to be included in the request:
   1. Complete data substantiating compliance of proposed substitution.
   2. Product identification, including manufacturer's literature and manufacturer's name.
   3. Current certificate from an accredited testing laboratory comparing the physical and performance attributes of the proposed material with those of the specified materials. Test results must be dated, notarized, and on testing laboratory stationary.
   4. Material Safety Data Sheets providing all pertinent data as to flammability, combustibility.
   5. List of at least (5) five jobs as described under the requirements where the proposed alternate material was used under similar conditions. These jobs must be available for inspection by the Owner or Owner's Representative. Names and phone numbers are required for verification. Submit a minimum of 200,000 square feet for review. Submitted projects must be a minimum of (5) years old.
   6. Notarized statement from the Roof System Manufacturer, signed by a corporate officer of the corporation stating that:
      a. All Documents have been reviewed and are approved.
      b. The Project site has been inspected.
      c. The Roofing System Manufacturer will provide two (2) field inspections weekly; during, and until all construction work is complete and accepted by the owner. A full time employee of the manufacturer must perform inspections.
      d. Provide documentation of the proposed alternate system passing the specified regulatory requirements. Documentation must be on the specified regulatory requirements letterhead or approval guide. No third party testing will be accepted.

D. In making substitution request, Bidder/Contractor represents:
   1. He has personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified. Additionally, he will have a technical service representative of the proposed manufacturer attend the pre-bid meeting.
   2. He will provide the same guarantee for substitution as for those specified.
   3. He will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
   4. Advise the owner of any credit savings or additional costs as opposed to the system type specified.

E. Substitutions will not be considered if:
   1. Product or method to be considered does not have a minimum of (5) five years of successful performance in roofing and re-roofing of similar applications.
   2. Any discrepancies in the test data, or if the tests or submittals are incomplete.
   3. They are indicated or implied on Shop Drawings or Project Data Submittals without formal request submitted in accordance with the specification document.
   4. Acceptance requires significant revision of documents.
   5. Only substitutes approved in writing by prior to scheduled cutoff date will be considered.
   6. Notification of approvals will be mailed at least 3 days before bid opening.
   7. The Owner will not incur any additional costs for design or construction costs.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.

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B. Manufacturer Qualifications: Approved manufacturer listed in this Section, UL listed for roofing systems comparable to that specified for this Project, with minimum five years' experience in manufacture of thermoplastic roof membrane products in successful use in similar applications.

C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
   1. An authorized full-time technical employee of the manufacturer.

D. Random Sampling
   1. During course of work, the Architect may secure samples according to ASTM D140-93 of materials being used from containers at job site and submit them to an independent laboratory for comparison to specified material.
   2. Should test results prove that material is not equal to specified material:
      a. Contractor shall pay for all testing.
      b. Roofing installed and found not to comply with the specifications shall be removed and replaced with no change in the contract price.
   3. Installation quality control
      a. The roofing inspector shall provide written and photographic reports, to be submitted to the architect, owner, roof system installation contractor, appraising the installation of the roof system at each of the project progress stages. The installation contractor shall make all necessary corrections, additions or remedial actions to resolve any issues raised in the reports.
      b. The roofing inspector shall have the authority to have any and all roofing work corrected, as required, to insure the proper installation and weather-tightness of the roof system, in accordance with the manufacturer's specifications.

E. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written recommendations and instructions for installation of products.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

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1.10 PROJECT / FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
   1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
   2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
   3. Remove temporary plugs from roof drains at end of each day.
   4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.11 WARRANTY

A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.
   1. Form of Warranty: Manufacturer's standard warranty form.
   2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
   3. Warranty Period: 15 years from date of completion.

B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
   1. Inspections to occur in following years: 2, 5 and10 following completion.

C. Installer Warranty: Installer's warranty signed by Installer, as follows.
   1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
   2. Scope of Warranty: Work of this Section.
   3. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. (Basis of Design): The roof system specified in this Section is based upon products of Tremco CPG Inc, Beachwood, OH, (800) 562-2728, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products.
   1. Manufacturers of comparable products: Approved by Architect prior to bid.

B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

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A. Wind uplift Compliance: Provide roofing membrane, base flashing, and component materials that comply with the requirements to acquire a certificate of wind storm from the State of Texas. Basis of Compliance: NEMO Evaluation Report NER-TRM-002 for FL16425-R8 Construction W-69. IT IS THE CONTRACTORS RESPONSIBILITY TO READ AND FOLLOW THE PROVIDED TESTED ASSEMBLY. A LIST OF THE BASIS OF DESIGN ASSEMBLIES MAY BE LOCATED FROM THE FBC WEBSITE OR THE SYSTEM MANUFACTURER.

B. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
   1. Accelerated Weathering: Roofing system shall withstand 10,000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
   2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency in accordance with ANSI/FM 4474, UL 580, or UL 1897, and to resist uplift pressures calculated in accordance with ASCE-7 and applicable code.
   1. All Zones (Corner, Perimeter, and Field-of-Roof) Uplift Pressures: As indicated on Drawings. Verify specified system meets all uplift requirements with project engineer prior to installation.

D. SPRI Wind Design Standard: Manufacture and install copings and roof-edge flashings tested according to ANSI/SPRI ES-1.
   1. Design Pressure: As indicated on Drawings. Verify installation methods are acceptable to project windstorm engineer prior to installation.

E. Flashings and Fastening: Comply with requirements of Division 07 Sections “Sheet Metal Flashing and Trim” and “Roof Specialties.” Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
   1. FM Global 1-49: Loss Prevention Data Sheet for Perimeter Flashings.
   2. FM Global 1-29: Loss Prevention Data Sheet for Above Deck Roof Components.
   3. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
   4. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.
   5. Comply with requirements of Division 07 Section "Sheet Metal Flashing and Trim".

F. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

G. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E1980, based on testing identical products by a qualified testing agency.

2.3 MATERIALS, GENERAL

A. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

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2.4 THERMOPLASTIC MEMBRANE MATERIALS

A. PVC Roof Membrane:
   1. Thermoplastic PVC/TPA sheet, internally fabric reinforced and fleece backed, Energy Star qualified, CRRC listed, and California Title 24 Energy Code compliant, ASTM D4434 Type IV.
   a. Basis of design product: Tremco, TPA FB Single Ply Roof Membrane.
   b. Tensile Strength at 0 deg. F (-18 deg. C), minimum, ASTM D751: 350 lbf/in (1550 N).
   c. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D751: 100 lbf (440 N).
   d. Elongation at 0 deg. F (-18 deg. C), minimum at fabric break, ASTM D751: 35 percent machine direction, 33 percent cross-machine direction.
   e. Minimum Thickness, nominal, ASTM D751: 0.060 in (1.5 mm).
   f. Color: White.
   g. Solar Reflectance Index (SRI), ASTM E1980: 108 (White, initial); 84 (White, 3-year aged).
   h. Recycled Content, minimum: 25 percent pre-consumer.

B. Membrane Flashing: Manufacturer's standard, smooth-backed, sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.

2.5 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.
   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Membrane Adhesive:
   1. Cold-applied bio-based low odor urethane roofing adhesive, two-part, USDA BioPreferred, formulated for compatibility and use with specified roofing membranes and flashings.
      a. Basis of design product: Tremco, POWERply Endure BIO Adhesive TF.
      b. Volatile Organic Compounds (VOC), maximum, ASTM D3690: 0 g/L.
      c. Low Temperature Flexibility, ASTM D2240: Pass at -30 deg F (-34 deg C).
      d. Solids, by Volume, ASTM D2697: 100 percent.
      e. Biobase Content, Minimum, ASTM D6866: 70 percent.

C. Flashing Membrane Adhesive:
   1. Elastomeric solvent-based contact-type adhesive for bonding TPA fleece-backed and non-fleece-backed single ply membranes and flashings to substrates.
      a. Basis of design product: Tremco, TPA Single Ply Bonding Adhesive.
      b. Density at 77 deg. F (25 deg. C), minimum, ASTM D147: 7.0 lb/gal (0.84 kg/L).
      c. Percent solids, minimum ASTM D316: 25 percent.
      d. VOC, maximum, ASTM D 3960: 612 g/L.

D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors.

E. Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to membrane roofing system manufacturer.

F. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.

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1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
   a. Basis of design product: Tremco, TremSEAL Pro.
   b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
   c. Hardness, Shore A, ASTM C661: 40.
   d. Adhesion to Concrete, ASTM C794: 35 pli.
   e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
   f. Color: Closest match to substrate.

G. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."
   1. Vents and/or Stacks:
      a. Stainless: Type 316.
      b. Gage: Twenty-four (24).
      c. Solder: ASTM B32-89, alloy grade 60A. Neutralize flux after soldering.
   2. Termination Bar for top edge of all base flashings:
      a. Extruded aluminum, pre-punched 8” o.c.
   3. Fascia, Pitch Pans, Primary Scuppers and Overflow Scuppers:
      a. TPA membrane factory laminated to hot-dipped galvanized steel. 24gauge, G90 hot dipped galvanized steel, cack wash coat of 0.0001” clear acrylic, laminated on one side with 20 mil unreinforced TPA membrane.
   4. Coping, Collector Heads, Gutters, Downspouts, designated cladding and other Visible Sheet Metal Flashing: Match existing size, profile and location.
      a. Galvalume, Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340), prepainted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.
         1) Paint finish at exposed side: Factory applied baked-on two (2) coat system comprised of one (1) coat of full 70% resin fluorocarbon by Kynar 500 or accepted substitute over a smooth coat of corrosion-resistant epoxy-based primer. Color as selected by owner.
         2) Finish at underside shall be a wash coat over a coat of corrosion-resistant epoxy-based primer
   5. Counter flashing, slip flashing:
      a. Galvalume, Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 50 (Class AZM150 coating designation, Grade 340), prepainted by the coil-coating process to comply with ASTM A 755/A 755M; structural quality.
      b. Gage: Twenty-four (24)
   6. Pitch pans with hoods:
      a. Stainless Steel, Type 304: Twenty-four (24) gauge minimum, stainless steel; commercial quality, Fed. Spec. QQ-S-775, Type I, Class D or ASTM A 526 or lock forming quality ASTM A 527, G90 coating in accordance with ASTM A 525
   7. Roof top splash pans.
      a. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface, .040-.050, with water slowing ridges.
      b. Stainless Steel, Type 316. Twenty-four (24) gauge minimum, stainless steel; commercial quality, Fed. Spec. QQ-S-775, Type I, Class D or ASTM A 526 or lock forming quality ASTM A 527. Fabricate with water slowing ridges.
      c. Concrete splash pads at ground level: Refer to drawings for size and detail

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H. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.
   1. Roof Drain & Scupper Target Striping: Polyurethane Elastomeric Fluid-Applied System: Two-coat fluid-applied roofing membrane formulated for application over prepared existing roofing substrate.
      a. Basis of design product: Tremco, AlphaGuard BIO Top Coat.
   2. Roof Drain & Scupper Target Primer: Polyurethane Elastomeric Fluid-Applied System: Single component primer designed to enhance adhesion to approved substrates and applications of urethane based products.
      a. Basis of design product: Tremco, Geogard Primer.
   3. Roof Drain & Scupper Target Striping: Polyester Reinforcing and Protection Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings and as a protection layer under pavers or stone aggregates.
      a. Basis of design product: Tremco, Permafab.

I. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.6 ROOF INSULATION MATERIALS

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from insulation manufacturer's standard sizes, suitable for application, and of thicknesses indicated.
   1. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated, not less than two times the roof slope.

B. Roof Insulation: Provide roof insulation product in thicknesses indicated in Part 3 as follows:
   1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.
      a. Basis of design product: Tremco, Trisotech Insulation.
      b. Compressive Strength, ASTM D1621: Grade 2: 20 psi (138 kPa).
      c. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.
      d. Available manufacturer's:
         1) Tremco
         2) Atlas AC Foam II

2.7 ROOF INSULATION ACCESSORIES

A. Cover Board:
   1. Gypsum panel, glass-mat-faced, primed, ASTM C1177/C1177M.
      a. Basis of design product: Tremco/SECUROCK.
      b. Thickness: 1/2 inch (12 mm).

B. Insulation Cant Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

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C. Tapered Edge Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.

D. Substrate Joint Tape: 6- or 8-inch- (150- or 200-mm-) wide, coated, glass fiber.

E. Insulation Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
   1. Available Manufacturer's:
      a. Tremco #15 EHD Fastener with Tremco 3" Metal Insulation Plate
      b. Tremco #1510 XHD Fastener with Tremco Disc 3 In. Steel Stress Plate
      c. Dekfast DF-#15-PH3 with Dekfast PLT-R-3

2.8 WALKWAY MATERIALS

A. Walkway Material:
   1. Walkway roll, reinforced PVC/TPA membrane roll with serrated slip-resistant surface, fabricated for heat welding to compatible PVC/TPA membrane surface.
      a. Basis of design product: Tremco, TPA Walkway Roll.
      b. Roll Size: 36 inches by 60 foot (914 mm by 18.3 m).
      c. Thickness / Color: Yellow, 0.156 inch (4 mm).
      d. Tensile, Grab ASTM D751: 200 lbf (890 N).
      e. Tear Strength, Tongue : 45 lbf (200N).
      f. Low Temp Flex: -40 deg F. (-40 deg C.).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
   1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
   2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
   3. Steel Roof Deck:
      a. Verify that deck is securely fastened and properly supported with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
   4. Verify that existing substrate is sound and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

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C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION, GENERAL

A. Install roofing system in accordance with manufacturer's written instructions and approved details.

B. NRCA Installation Details: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations; modify as required to comply with manufacturer's approved details and perimeter fastening requirements of FM Global references if applicable.

3.4 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Tapered Insulation, Drains, and Crickets: Install tapered insulation under area of roofing to conform to slopes indicated.
   1. Where crickets are indicated or required to provide positive slope to drain, make slope of crickets minimum of two times the roof slope, not less than 1/4 inch in 12 inches (1:48).

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (70 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
   1. Flat Insulation System on Sloped Roof Deck: Install insulation at minimum thickness as follows:
      a. Minimum total thickness of Continuous Insulation: 4.5 inches.

E. Insulation Drain Sumps: Tapered insulation sumps, not less than 2 by 2 ft. (600 by 600 mm), sloped to primary roof drain; sump to maximum depth of not more than 1 inch (25 mm) less than the Project-stipulated continuous insulation thickness based upon code requirements.

F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
   1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

H. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
   1. Loosely lay insulation and secure to deck with mechanical fasteners installed with mechanically-attached cover board.

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I. Cover Boards: Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.
   1. Secure cover boards to resist uplift pressure at corners, perimeter, and field of roof.
   2. Mechanically fasten cover boards.
      a. 1 fastener per 1.0 sq. ft.

3.5 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Urethane Adhesive, Ribbon-Applied for Fleece-Backed Membranes: Apply to substrate at adhesive bead size and spacing required by manufacturer for wind uplift performance requirements. Apply at not less than 1/4 inch (6 mm) wide adhesive bead at 12 inches (300 mm) oc. Roll membrane in wet adhesive. Do not apply adhesive to splice area of membrane.

E. 2-part urethane Bonding Adhesive: Apply to substrate at rate required by manufacturer. Install membrane immediately into adhesive, avoiding any air entrapment; do not allow adhesive to dry. Roll membrane into wet adhesive. Do not apply adhesive to splice area of membrane. Do not apply adhesive to splice area of membrane.

F. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.

G. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

H. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
   1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
   2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
   3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

I. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

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C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Seal top termination of base flashing with a metal termination bar and a continuous bead of joint sealant.

3.7 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

A. Roofing Inspector: Owner will engage a qualified roofing inspector to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 54 19

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SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Roof drainage sheet metal fabrications.
2. Low-slope roof sheet metal fabrications.
3. Manufactured reglets and counterflashings.
4. Miscellaneous sheet metal flashing and trim.

B. Related Requirements:

1. Division 01 Section “Windstorm Rated Construction”
2. Division 06 Section " Rough Carpentry” for wood nailers, curbs, and blocking.
3. Division 07 Section " 07 54 19 " and “ 07 54 20 ”for warranty requirements for sheet metal flashing and trim items integral with roofing.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leak proof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site in coordination with roofing Preinstallation conference.

1. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

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1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.

2. Include identification of material, thickness, weight, and finish for each item and location in Project.

3. Indicate details meet requirements of SMACNA, NRCA and FMG required by this Section.

C. Samples for Verification: For each type of exposed finish.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Contractor's Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.

C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

B. Warranties: Manufacturer's executed warranty documents. Submit prior to acceptance of Work.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

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1.10 WARRANTY

A. Refer to warranty requirements of Division 07 Section Modified Bitumen Roofing for terms and conditions of warranties covering work of this Section.

B. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Flashings and Fastening: Comply with requirements of Division 07 roofing sections. Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:

1. FM Global 1-49: "Property Loss Prevention Data Sheet for Perimeter Flashings."

2. FM Global 1-29: "Property Loss Prevention Data Sheet for Above Deck Roof Components."

3. NRCA: "The NRCA Roofing Manual" for construction details and recommendations.

D. SPRI Wind Design Standard: Manufacture and install roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:

1. Design Pressure: As indicated on drawings.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. TPA Clad Metal Sheet: Flexible non-reinforced TPA membrane factory laminated to hot-dipped galvanized steel.

1. Finish: TPA membrane 20 mil
2. Color Finish: White

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3. Concealed Finish: Clear Acrylic

C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 316, dead soft, fully annealed; with smooth, flat surface.

1. Finish: 2D (dull, cold rolled).

D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Smooth, flat.

2. Exposed Coil-Coated Finish:

a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Color: As scheduled on Finish Schedule.

4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.

1. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C) or lower.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

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a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

4. Fasteners for Zinc-Coated(Galvanized) and Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Solder:

1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethanepolymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

2. Obtain field measurements for accurate fit before shop fabrication.

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3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

G. Seams, Soldered: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

I. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

1. Expansion Joints: Butt type with cover plate.

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B. Built-in Gutters: Fabricate to cross section required, with riveted and soldered joints, complete with end pieces, outlet tubes, and other special accessories as required. Fabricate in minimum 96-inch- (2400-mm-) long sections. Fabricate expansion joints and accessories from same metal as gutters unless otherwise indicated.

1. Fabricate gutters with built-in expansion joints.

2. Fabricate from the Following Materials:

a. Prepainted, Metallic Coated Steel: 24 ga thick.

C. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

1. Fabricate from the Following Materials:

a. Prepainted, Metallic Coated Steel: 24 ga thick.

D. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fabricate from the following materials:

1. TPA Coated Metal: 24ga thick.

E. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes built-in overflows. Fabricate from the following materials:

1. Prepainted, Metallic Coated Steel: 24ga thick.

F. Splash Pans: Fabricate to dimensions and shape required and from the following materials:

1. Aluminum: 0.040 inch (1.02 mm) thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long sections. Furnish with 6-inch- (150-mm-) wide, joint cover plates. Shop fabricate interior and exterior corners.

1. Joint Style: Butted with expansion space and 6-inch- (150-mm-) wide, exposed cover plate.

2. Fabricate from the Following Materials:

a. TPA Coated Metal: 24ga thick.

B. Thru-wall Reglet Flashing: Fabricate from the following materials;

1. Stainless Steel: 24ga thick

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C. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, fasten and seal watertight.

1. Joint Style: Butted with expansion space and 6-inch- (150-mm-) wide, exposed cover plate.

2. Fabricate from the Following Materials:

a. Prepainted, Metallic Coated Steel: 24 ga thick.

D. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Prepainted, Metallic Coated Steel; 24ga thick.

E. Flashing Receivers: Fabricate from the following materials:

1. Stainless Steel: 24ga thick.

F. Roof-Penetration Flashing: Fabricate from the following materials:

1. TPA Coated Metal: 24ga thick.

G. Roof-Drain Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.016 inch (0.40 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.

2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

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B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.

5. Torch cutting of sheet metal flashing and trim is not permitted.

6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

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2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).

2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder for aluminum sheet.

2. Do not use torches for soldering.

3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

H. Rivets: Rivet joints in uncoated aluminum where necessary for strength.

3.4 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters: Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Fasten gutter spacers to front and back of gutter.

2. Anchor and loosely lock back edge of gutter to continuous cleat.

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3. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches (600 mm) apart.

4. Anchor gutter with straps spaced not more than 24 inches (600 mm) apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.

5. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet (15.24 m) apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.

2. Provide elbows at base of downspout to direct water away from building.

3. Connect downspouts to underground drainage system.

D. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

1. Anchor scupper closure trim flange to exterior wall and solder to scupper.

2. Loosely lock front edge of scupper with conductor head.

3. Seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.

E. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch (25 mm) below scupper discharge.

F. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches (100 mm) in direction of water flow.

3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch (75-mm) centers.

C. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

D. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

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E. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

F. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

G. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm). Secure in waterproof manner by means of anchor and washer at 36-inch (910-mm) centers unless otherwise indicated.

3.6 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Reglets: Installation of reglets is specified in Section 04 20 00 "Unit Masonry."

3.7 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

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SECTION 07 65 00 – FLEXIBLE FLASHING SELF-ADHERING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.01 SUMMARY

A. Flexible stainless steel self-adhering flashing

B. Related sections:
1. 04 20 00 Unit Masonry
2. 05 40 00 Cold Formed Metal Framing.
4. 06 10 00 Rough Carpentry.
6. 07 62 00 Sheet Metal Flashing and Trim.

1.02 REFERENCES

A. Standards of the following as referenced:
1. ASTM
2. Brick Industry Association (BIA)

B. Industry standards:
1. BIA Technical Notes on Brick Construction No. 7, Water Penetration Resistance- Design and Detailing, August 2005.
2. BIA Technical Notes on Brick Construction No. 28B, Brick Veneer/Steel Stud Walls, August 2005.

1.03 DEFINITIONS

A. Terms:
1. Cavity wall flashing: Same as flexible flashing.
2. Foundation sill flashing: Same as flexible flashing.
3. Flexible flashing: Water-proof material typically used in cavity wall construction to contain and assist in the proper water drainage that may penetrate wall system veneer. Other materials may be required to constitute the system.
4. Head and sill flashing: Same as flexible flashing.
5. Through-wall flashing:
   a. Generally considered the same as flexible flashing.
   b. Rare definition referred to full width cap flashing under copings or wall caps.

1.04 SUBMITTALS

A. Product data: Indicate material type, composition, thickness, and installation procedures.

B. Samples: 3" by 5" flashing material.

C. Product Quality & Environmental submittals:
1. Certificates:
   a. Indicate materials supplied or installed are asbestos free.
   b. Indicate recycled content: 60% total recycled material; based on 60% Post Industrial Recycled Content.

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2. Performance Attributes
   a. Tensile strength, >90,000 psi minimum, copper 32,000 psi average
   b. Puncture Resistance, >2,500 pounds average, copper 450 psi average
   c. When tested as manufactured, product resists growth of mold pursuant to test method ASTM D3273.
   d. Certify the use of domestic manufactured stainless steel for flashing.
   e. Certify products contain no silica or asbestos.

1.05 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Provide flashing materials by single manufacturer with not less than twenty five years of experience in manufacturing flexible flashing products.
   2. Flashing materials must be able to withstand 300º F temperature without changing the long term performance of the flashing.

PART 2 PRODUCTS

2.01 MANUFACTURED UNITS

A. Flexible flashing:
   1. Products of manufacturers listed below meeting indicated standards and specified manufacturer's product data characteristics, except as modified below, are acceptable for use, subject to compliance with specified requirements.
      a. Product standard of quality:
         1). York Manufacturing, Inc.; York 316 SS
         2). STS Coatings, Inc.; Wall Guardian Self Adhering 316 Stainless Steel Flashing
         3). Vapro Shield, Inc.; VaproThru-Wall Flashing SA 316
         4). Other products that meet the criteria in section 1.04
   2. Characteristics:
      a. Type: stainless steel core with one stainless steel face (outward facing) with a butyl block co-polymer adhesive (inward facing).
      b. Stainless steel: type 316, ASTM A240. Domestically sourced per DFARS 252.225-7008 and/or DFARS 252.225-7009.
      c. Adhesive: block co-polymer
      d. Size: Manufacturer's standard width rolls.

B. Accessories:
   1. Polyether sealant:
      a. York Manufacturing, Inc.; UniverSeal US-100
      b. STS Coatings; GreatSeal LT-100
      c. Prosoco, Inc.; R-Guard Joint Seam Sealer
   2. Splice Tape:
      a. York Manufacturing, Inc.; York 316 SS
   3. Corner and End Dams: form the stainless steel flashing in the field or use 26 gauge stainless steel pre-manufactured corners.
   4. Mortar deflection: polyester strands that will not degrade and will keep weep vents from clogging with mortar.
      a. York Manufacturing; Weep-Armor or approved comparable product.
   5. Termination bar: rigid PVC or stainless steel termination bar with sealant catch lip
      a. York Manufacturing; T-96 termination bar

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b. York Manufactuirng; SS Term Bar

PART 3 EXECUTION

3.01 INSTALLATION

A. General:
1. Install where indicated, specified, or required in accord with flashing manufacturer's written instructions and as follows.
2. Extend flashing 6" minimum beyond opening. Fold flashing ends at end of openings or horizontal flashing terminations to form end dam or use pre-manufactured units made of 26 gauge stainless steel.
3. Flashing width: Width required starting flush with outside face of exterior wythe, extending through cavity, rising height required to extend above lintel steel at least 2".
4. Splice end joints by overlapping them a minimum of 2” and seal with a compatible sealant or metal splice tape.
5. Masonry back up:
   a. Surface apply after dampproofing installation specified in Damp proofing/Air Barrier Section in accord with manufacturer’s installation instructions.
   b. Fasten to masonry back-up surface at top by embedding in layer of sealant or use a non-corrosive termination bar and fasten it to the backer wall at the top edge of the flashing and seal the top edge with compatible sealant or use a termination clamp, which is embedded in the block back up wall.
6. Concrete back up:
   a. Surface apply after damp proofing/air barrier installation specified in damp proofing Section in accord with manufacturer’s installation instructions.
   b. Fasten to concrete surface at top by embedding in layer of sealant or use a non-corrosive termination bar and fasten it to the backer wall at the top edge of the flashing and seal the top edge with a compatible sealant.
7. Stud back up with sheathing:
   a. Fasten to stud back-up at top by embedding in layer of sealant or use a non-corrosive termination bar and fasten it to the backer wall at the top edge of the flashing and seal the top edge with a compatible sealant.
8. Leave ready for certified compatible building felt or air barrier installation lapping flashing top installed in another Section.
9. Fold ends of flashing at end of opening to form dam; seal with polyether sealant or use purchased manufacturers preformed end dams.
10. Inside and outside corners: Make in industry accepted manner using corner and splice material or purchase manufactured corners from manufacturer.
11. Use stainless steel or copper drip edge any location that the underside of the flashing will be exposed and/or deemed necessary by the design professional or AHJ on the project.
12. Cover flashing within a few days of installation to protect it from damage from the different trades, the environment and falling debris. If flashing is left unprotected and it is punctured, torn, or has loose scrim you should contact the manufacturer for repair instructions.

3.02 SCHEDULES

A. Locations:
1. Exterior door heads.
2. Window heads, jambs and sills.
3. Storefront heads.

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4. Horizontal control joints.
5. Changes in veneer materials, vertically.
6. Other wall openings.
7. Other locations indicated on drawings.

END OF SECTION 07 65 00

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SECTION 07 84 00 – FIRESTOPPING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SECTION INCLUDES

A. Non-combustible firestopping and fire safing materials, and accessories as shown on drawings, or if not shown, as required, including but not limited to the following:.
   1. Intumescent Caulks, Elastomerics, Sealants, Compounds, Putties, Joint Sprays, Wrap Strips, and Coatings
   2. Silicone Sealants
   3. Mortar Materials (Cementitious)
   4. Firestopping Foam Materials
   5. Fire Block Materials
   6. Pillow Materials
   7. Mat Materials
   8. Cast-in-place Devices, Collars, and other materials, including fire/smoke stop systems, which meet the specified requirements.

B. General description of the work in this section:
   1. Only tested firestop systems shall be used in specific locations as follows:
      a. Penetrationsfor the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies) and vertical service shaft walls and partitions.
      b. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
      c. Openings and penetrations in fire-rated partitions or walls containing fire doors.
      d. Openings around structural members which penetrate floors or walls.

RELATED WORK

A. Section 03 30 00 - Cast-in-Place Concrete
B. Section 04 20 00 - Masonry
C. Section 07 21 00 - Building Insulation
D. Section 07 90 00 - Building Sealants
E. Section 09 24 00 - Lath and Plaster
F. Section 09 21 16 - Gypsum Wallboard Systems: Wallboard used for fire rated construction.
G. Division 23 - Mechanical: Requirements for penetrations through fire rated construction.
H. Division 26 - Electircal: Requirements for penetrations though fire rate construction.

REFERENCES

A. ASTM International (ASTM)
   1. C665, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
   2. E84, standard Test Method for Surface Burning Characteristics of Building Materials
   3. E119, Standard Test Methods for Fire Tests of Building Construction and Materials
   4. E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops
   5. E2174, Standard Practice for On-Site Inspection of Installed Fire Stops

B. National Fire Protection Association (NFPA)
   1. 70, National Electric Code

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2. 101, Life Safety Code

C. Underwriters Laboratories (UL)
1. 163, Fire Tests of Building Construction and Materials
2. 1479, Fire Test of Through-Penetration Firestops
3. 2079, Tests for Fire Resistance of Building Joint Systems
4. UL Fire Resistance Directory:
   a. Firestop Devices (XHJI)
   b. Fire Resistance Ratings (BXRH)
   c. Through-Penetration Firestop Systems (XHEZ)
   d. Fill, Voids, or Cavity Material (XHHW)
   e. Forming Materials (XHKU)
   f. Joint Systems (XHBN)

D. International Firestop Council Guidelines for Evaluation Firestop Systems Engineering Judgments

PERFORMANCE AND QUALITY ASSURANCE REQUIREMENTS

A. Firestopping Materials:
1. Shall be rated as non-combustible when tested in accordance with ASTM E119 to achieve fire rating noted on the drawings and provide a fire rating equal to that of construction being penetrated. If no such fire rating is noted on the drawings, the fire rating shall be required by the authorities having jurisdiction.
2. If such materials are used in a through-penetration seal condition, they shall be approved for such use, with all requried devices and accessories forming an assembly or included in the test, when tested in accordance with ASTM E814 or UL 1479.
3. Tests shall be performed by an approved testing agency to indicate compliance with specified requirements and the resulting approval number shall b ethe latest or current test approved by authorities having jurisdiction. For those firestop applications that exist for which no UL tested system is available through a manufacturer, an engineering judgment derived from similar UL and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council.

B. Fire safing Materials:
1. Shall be tested and rated non-combustible to achieve fire rating noted on the drawings, or if not noted, as required by authorities having jurisdiction.
2. If such materials are used in an assembly, they shall be approved for such use, with all required devices and accessories forming an assembly or included in the test.
3. Tests shall be perfrmed by an approved testing agency to indicate compliance with specified requirements and the resulting approval number shall be the latest or current test approved by authorities having jurisdiction.
4. Proposed fire safing materials and methods shall conform to applicable governing codes having local jurisdiction.

C. Definitions: As they appear in this Section:
1. Combustible: Penetrations composed of any material which will burn or melt in a fire, including, but not limited to the following:
   a. Nonmetallic pipes made of glass or plastic.
   b. Metallic pipes made of lead or aluminum.
   c. Electrical, data, communication, security, and telephone cables.

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2. Non-combustible: Penetrations composed of material which will not burn or melt in a fire, including, but not limited to the following:
   a. Metallic pipes made of steel, iron or copper.
3. Approved Testing Agencies: UL or other testing agency licensed and equipped to conduct the required fire tests and approved by authorities having jurisdiction.
4. Authorities Having Jurisdiction: Shall be the person or entity responsible for applicable governing code enforcement.

D. Manufacturer Qualifications: Those listed in Paragraph 2.1, A, or company specializing in manufacuturing the products specified in this Section with minimum of five (5) years experience. Refer to Division 1 for substitutions.

E. Installer Qualifications: Company specializing in performing the Work of this Section with minimum three (3) years experience installing tested and classified firestop and fire safing systems or manufacturer certification and approval.

F. Standards: All firestop and fire safing systems shall have a flame (F) rating and temperature (T) rating conforming to applicable building codes and in accordance with Drawings and Specifications.

G. Sincle Source Responsibility: Obtain firestopping and fire safing materials from a single manufacturer for each different product required.

H. No firestopping or fire safing materials shall be concealed or covered until they have been observed and approved for use by the Architect and/or authorities having jurisdiction.

SUBMITTALS

A. Product Data:
   1. Manufacturer's technical data on product characteristics, performance, and limiation criteria for each material including UL firestop systems to be used.
   2. Manufacturer's installation instructions.
   3. Manufacturer's Materal Data Sheets (MSDS)

B. Shop Drawings: Manufacturer's shop drawings or detail sheets indicating each condition that requires a penetration or joint seal. Details must be in accordance with proposed approved system. Include materials to be used, anchorage, methods of installation and relationship to all adjacent construction.

C. Manufacturer's engineering judgement identification number and drawing details when no UL system is available for application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in drawing.

D. Certifications:
   1. Manufacturer's certification of compliance indicating approval of authorities having jurisdiction for combustibility and use of materials, and that their installation conforms to shown or required fire rating.
   2. Manufacturers affidavit that materials used in Project contain no asbestos.

DELIVERY, STORAGE AND HANDLING

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A. Deliver and store materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

INSTALLER QUALIFICATIONS

A. Engage an experienced installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an installer engaged by the Contractor does not in itself confer qualification on the buyer.

REGULATORY REQUIREMENTS

A. Conform fire resistance ratings and surface burning characteristics of authorities having jurisdiction.

B. Provide certificate of compliance from manufacturer indicating approval or authorities having jurisdiction for combustibility and use of materials, and that their installation conforms to shown or required fire rating.

ENVIRONMENTAL REQUIREMENTS

A. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

B. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

C. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

D. Provide ventilation in areas to receive solvent cured materials.

E. Sequence Work to permit firestopping and fire safing materials to be installed after adjacent and surrounding work is complete.

WARRANTY

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A. Warrant the work specified herein for two (2) years against becoming unserviceable or causing an objectionable apperance resulting from either defective or non-conforming materials and workmanship.

B. Defects shall include, but not be limited to:
   1. use of incorrect material within the installation
   2. No mineral wool insulation within a system that requires it.
   3. Use of mineral wool insulation when ceramic fiber insulation is required.
   4. Incorrect amount of material is installed within system.
   5. No use of an accessory seal within a system that requires one.
   6. Use of an incorrect system with a firestop or fire safing installation.
   7. Failure to meet specified performance or quality assurance requirements.

MANUFACTURERS/PRODUCTS

A. Subject to compliance with through penetration firestop systems listed in Volume II of the UL Fire Resistance Directory (XHEZ), manufacturers specified are approved for use in the Project. Other manufacturers must have a minimum of five (5) years experience manfacturing products meeting or exceeding the specifications and comply with Division 01.
   1. Hilti, Inc.
   2. Nelson Firestop Products
   3. Specified Technologies, Inc.
   4. Tremco Inc.
   5. 3M Fire Protection Products

B. To maintain clarity of products, specifications are based on specified products manufactured by Hilti, Inc.; Tulsa, OK. Listed manufacturers providing equivalent products are acceptable for use on this project.

C. It is recognized that the manufacturers listed may not produce all of the specified types of products, therefore, products from several manufacturers may be used throughout the project as long as consistent use of each individual product is maintained thoughout the project, they meet the requirements specified herein for the intended use, and are approved for that use by authorities having jurisdiction. Products which are combined to form a UL listed assembly must be provided as tested and approved as shown in the Fire Resistance Directory.

MATERIALS AND COMPONENTS

A. General:
   1. Any of the following materials, either by itself or in combination with other materials my be used on the Project provided they:
      a. Satsify the firestopping and fire safing requirements for use in the required application on the Project.]
      b. Meet the performance and quality assurance requirements specified herein.
      c. Are approved for use in that application by the authorities having jurisdiction.
   2. Materials shall comply with ASTM E814 (UL 1479) or ASTM E1119 (UL 263), and shall be manufactured of non-toxic, non-hazardous, asbestos free materials. Product shall bear proper independent test laboratory label/logo and shall conform to construction assembly type, penetrating item type, annular space requirements, and fire rating involved for each separate instance.

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B. Primers: Conform to firestop manufacturer's recommendations for primers required for various substrates and conditions.

C. Back-Up (Damming) Materials: Conform to firestop manufacturer's recommendations for back-up (damming) materials. Materal may be removable or permanent as recommended by manufacturer to suit application and as required by UL testing or other testing agency approved by authorities having jurisdiction.

D. Retainers: Steel angles, clips, sheet metal, and impaling fasteners to support damming material and fire safing material and where required by UL testing or other testing agency approved by authorities having jurisdiction.

E. Adhesives and Fasteners: Conform to firestop manufacturer's recommendations for adhesives and fasteners requried for various substrates and conditions and to suit intended use. Materials must conform to those required by UL testing or other testing agency approved by authorities having jurisdiction.

F. Firestopping Fill, Void, and Cavity Materials: Shall conform to those required by UL testing or other testing agency approved by authorities having jurisdiction, including, but not be limited to the following. Refer to list of approved manufacturers:
   1. Cast-in place firestop devices for use with combustible and non-combustible pipes (closed and open piping systems) and cable bundles penetrating concrete floors, the following products are acceptable:
      a. "CP 680 Cast-In Place Firestop Device" manufactured by Hilti, Inc.
         1) Add Aerator adaptor when used in conjunction with aerator ("sovent") system.
      b. "CP 681 Tub Box Kit" for use with tub installations manufactured by Hilti, Inc.
      c. "CP 682 Cast-In Place Firestop Device" for use with noncombustible penetrants manufactured by Hilti, Inc.
   2. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
      a. "FS-ONE Intumescent Firestop Sealant" manufactured by Hilti, Inc.
      b. "CP 604 Self-leveling Firestop Sealant" manufactured by Hilti, Inc.
      c. "CP 620 Fire Foam" manufactured by Hilti, Inc.
      d. "CP 606 Flexible Firestop Sealant" manufactured by Hilti, Inc.
      e. "CP 601s Elastomeric Firestop Sealant" manufactured by Hilti, Inc.
   3. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
      a. "CP 601s Elastomeric Firestop Sealant" manufactured by Hilti, Inc.
      b. "CP 606 Flexible Firestop Sealsnt" manufactured by Hilti, Inc.
      c. "FS-ONE Intumenscent Firestop Sealant" manufactured by Hilti, Inc.
   4. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
      a. "FS-ONE Intumescent Firestop Sealant" manufactured by Hilti, Inc.
   5. Foams, Intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
      a. "FS-ONE Intumescent Firestop Sealant" manufactured by Hilti, Inc.
      b. "CP 620 Fire Foam" manufactured by Hilti, Inc.
      c. "CP 601S Elastomeric Firestop Sealant" manufactured by Hilti, Inc.
      d. "CP 606 Flexible Firestop Sealant" manufactured by Hilti, Inc.

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6. Non curing, re-penetrable, intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
   a. "CP 618 Firestop Putty Stick" manufactured by Hilit, Inc.
   b. "CP 658T Firestop Plug" manufactured by Hilti, Inc.
7. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
   a. "CP 617 Firestop Putty Pad" manufactured by Hilti, Inc.
8. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
   a. "CP 643N Firestop Collar" manufactured by Hilti, Inc.
   b. "CP 644 Firestop Collar" manufactured by Hilti, Inc.
   c. "CP 645/648 Wrap Strips manufactured by Hilti, Inc.
9. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
   a. "CP 637 Firestop Mortar" manufactured by Hilti, Inc.
   b. "FS 657 FIRE BLOCK" manufactured by Hilti, Inc.
   c. "CP 620 Fire Foam" manufactured by Hilti, Inc.
   d. "CP 675T Firestop Board" manufactured by Hilti, Inc.
10. Non curing, re-penetrable materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
    a. "FS 657 FIRE BLOCK" manufactured by Hilti, Inc.
    b. "CP 675T Firestop Board" manufactured by Hilti, Inc.
11. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:
    a. "FS 657 FIRE BLOCK" manufactured by Hilit, Inc.
    b. "CP 658T Firestop Plug" manufactured by Hilti, Inc.

G. Fire Related Construction Joints and Other Gaps:
   1. "CP 601S Elastomeric Firestop Sealant" manufactured by Hilti, Inc.
   2. "CP 606 Flexible Firestop Sealant" manufactured by Hilti, Inc.
   3. "CP 672 Firestop Joint Spray" manufactured by Hilit, Inc.

H. Fire Safing Materials: Comply with ASTM C655, Type I, high-melt mineral fiber insulation with minimum nominal density of 4.0lbs per cubic foot, and having a maximum flame spread rating of 15 and smoke developed rating of 0. Size shall be 4 inches thick by 24 inches wide by 48 inches long, unless noted otherwise. Products containing asbestos strictly prohibited.
   1. "Thermafiber Safing Insulation" manufactured by Thermafiber, Inc.
   2. "Fibrex Safing Insulation" manufactured by Fibrex Insulations, Inc.
   3. "Delta Safing Board" manufactured by Rock Wool Manufacturing Company.

I. Jacketing (For use with fire protection board): 0.016 inch aluminum or 0.010 inch stainless steel roll jacketing as shown, or if not shown, as required where high traffic requires high durability and good appearance, and as directed by Architect.

EXAMINATION

A. Examine joints and openings indicated or required to receive firestop and fire safing materials, for compliance with requirements for proper configuration, installation tolerances and other conditions affecting firestop and fire safing performance.

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B. Do not proceed with installation until unsatisfactory conditions are corrected.

C. Beginning installation shall indicate acceptance of existing conditions. Work found to be defective or deficient due to uncorrected existing conditions prior to installation should be repaired or replaced at no additional expense to Owner.

PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
   1. Verify penetrations are properly sized and in suitable condition for application of materials.
   2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substance that may affect proper adhesion.
   3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
   4. Install back-up (damming) materials to arrest liquid material leakage.
   5. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.

COORDINATION

A. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.

B. Responsible trades to provide adequate spacing fo field run pipes to allow for installation of cast-in-place firestop devices without interferences.

INSTALLATION

A. General:
   1. Install firestop and fire safing materials in accordance with manufacturer's recommendations to provide F and T ratings as required by authorities having jursdiction.
   2. Install firestop materials in accordance with UL Fire Resistance Directory.
   3. Install firestop and fire safing materials with sufficient pressure to properly fill and seal openings, then tool or trowel exposed surfaces.

B. Firestopping Materials:
   1. Install primer and firestopping material in sufficient thickness, with required accessories to achieve rating, to uniform density and texture, in accordance with manufacturer's instructuctions and authorities having jurisdiction.
   2. Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.
   3. Consult with mechanical engineer, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
   4. Remove dam material after firestopping material has cured or allwo dam material to remain if required to maintain fire rating integrity or required by authorities having jurisdiction.
   5. Do not conceal or enclose any firestopping materials until they have been examined and approved use by the Architect and authorities having jurisdiction.

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C. Fire Safing Materials:
   1. Install fire safing in sufficient thickness, with retainer materials where shown or required to achieve fire rating in accordance with manufacturer's instructions and authorities having jurisdiction.
   2. Do not conceal or enclose any fire safing materials until they have been examined and approved for use by the Archtiect and authorities having jurisdiction.

D. Fire Protection Board Materials:
   1. Install fire protection board in proper type, size, and density, with adhesives, fasteners, and jacketing materials where shown or required to achieve fire rating in accordance with manufacturer's instructions and authorities havning jurisdiction.
   2. Do not conceal or enclose any fire protection board materials unitl they have been examined and approved for use by the Architect and authorities having jurisdiction.

PROTECTION

A. Protect adjacent surfaces from damage by material installation.

CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials.

QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable coade authorities.

C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, "Standard Practice for On-Site Inspetion of Installed Fire Stops".

D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

END OF SECTION 07 84 00

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SECTION 07 90 00 – JOINT SEALANTS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

A. Examine the drawings and all sections of the specifications to determine the extent of work required under this section.

B. Additional caulking work is specified separately under Division 03 - Site Work Concrete.

REFERENCES

A. ASTM International:
   1. ASTM C661 – Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.
   2. ASTM C794 – Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
   3. ASTM C834 – Standard Specification for Latex Sealants.
   4. ASTM C919 – Standard Practice for Use of Sealants in Acoustical Applications.
   5. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.
   6. ASTM C1193 – Standard Guide for Use of Joint Sealants.
   7. ASTM D1056 – Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
   8. ASTM D1667 – Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
   9. ASTM D2240 – Standard Test Method for Rubber Property – Durometer Hardness.
   10 ASTM D2628 – Standard Specification for Performed Polychoroprene Elastomeric Joint Seals for Concrete Pavements.

B. South Coast Air Quality Management District:
   1. SCAQMD Rule 1168 – Adhesive and Sealant Applications.

C. Codes
   1. 2021 International Building Codes.
   2. City of Corpus Christi Amendments and Ordinances.
   3. Texas Department of Insurance Windstorm Certification Program.

SUBMITTALS

A. Products Data: Submit date indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

B. Samples: Submit two samples illustrating sealant colors for selection.

C. Manufacturer's installation instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.

D. Certification from sealant manufactureres that their products are suitable for the use indicated and comply with Specifications requirements.

E. Report from sealant applicator summarizing results of preconstruction field adhesion testing.

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F. Warranty: Include coverage for installed sealants and accessories failing to achieve airtight seal , watertight seal, exhibit loss of adhesion or coheasion, and sealants which do not cure.

PRODUCTS

A. Manufacturers:
   1. Dow corning Corp.
   2. GE Silicones
   3. Pecora Corp
   4. Sika Corp
   5. Tremco Sealants & Waterproofing
   6. BASF Building Systems

MATERIALS

EXTERIOR SEALANTS:

A. General Purpose Exterior (Nontraffic) Sealant: Polyurethane; ASTM C920, Grade NS, Class 50, Uses M, G, A, and O; multi-component.
   1. Type: Dymeric 240 manufactured by Tremco
   2. Color: Standard colors matching finished surfaces.
   3. Applications: Use for:
      a. Control, expansion, and soffit joints in masonry.
      b. Joints between concrete and other materials.
      c. Joints between metal frames and other materials.
      d. Exposed joints in metal copings, trim and flashings.
      e. Other exterior nontraffic joints for which no other sealant is indicated.

B. General Purpose Exteror Traffic Bearing Sealant: Polyurethane; ASTM C920, Grade P, Class 25, Use T: mult-component.
   1. Type: THC 900/901 manufactured by Tremco; Use THC 901 for joints on slope greater than 5 percent.
   2. Color: Standard colors matching finished surfaces.
   3. Applications: Use for exterior pedestrian and vehicular traffic bearing joints.

C. High Performance Silicone Sealant: Silicone; ASTM C920, Type S, Grade NS, Class 50, Uses NT, G, A, and O; single component.
   1. Type: Spectrum 3 manfuctured by Tremco.
   2. Color: Standard colors matching finished surfaces.
   3. Applications: Use for joints between panels of composite or fabricated aluminum panel systems.

D. Exterior Foam Expansion Joint Sealer: Precompressed foam sealer, Polyurethance with water repellent, +/- 25 percent movement capability.
   1. Color: Face color as selected.
   2. Size: Ase required to provide watertight and airtight seal when installed.
   3. Applications: Use for exterior wall expansion joints.
   4. Manufacturers:
      a. Colorseal; Emseal Corp.
      b. Polytite R or Polytite Standard; Dayton Superior
      c. Illmod 600; Tremco

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E. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, non drying, non-skinning, non-curing.
   1. Type: Butyl Sealant manfuactured by Tremco.
   2. Applications: Use for concealed sealant bead in sheet metal work as concealed sealant bead in siding overlaps.

INTERIOR SEALANTS

A. General Purpose Interior Sealant: Acrylic emulsion laytex; ASTM C831, single component, paintable.
   1. Type: Tremflex 834 manufactured by Tremco.
   2. Color: Standard color matching finished surfaces.
   3. Applications: Use for interior wall and ceiling control joints, joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated. For interior control joints in brick, unpainted concrete masonry, cast stone, or stone, use General Purpose Exterior Sealant.

B. General Purpose Interior Traffic Bearing Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Use T; single-component.
   1. Type: Vulkem 116 manufactured by Tremco.
   2. Color: Standard colors matching finished surfaces.
   3. Applications: Use for interior pedestrian traffic bearing joints.

C. Silicone Sealant: Silicone; ASTM C920, Uses G, A, and O; single component, mildew resistant.
   1. Type: Tremsil 200 manufactured by Tremco.
   2. Applications: Use of joints between plumbing fixtures and floor and wall surfaces, joints between toilet room counter tops and wall surfaces, and tile control and perimeter joints in shower rooms and other wet areas.

ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
   1. Interior Sealants and Sealant Primers: Maximum volitaile organic compound content in accordance with SCAQMD Rule 1168.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer, compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

APPLICATION

A. Prepare joint surfaces, install backer rod and prime in strict accordance with the manufacturer’s written instructions.

B. Mix sealant, place in joint and tool finish in strict accordance with manufacturer’s written instructions.

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C. Exercise special care in preparing and priming horizontal portions of joints to be sealed which are subject to incidental water immersion.

GUARANTEE

A. Sealant installations shall be guaranteed for a period of two (2) years from the date of substantial completion against defects in materials and workmanship.

END OF SECTION 07 90 00

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SECTION 08 11 00 – METAL DOORS AND FRAMES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

GENERAL

A. Section includes:
   1. Interior and Exterior Steel doors and frames, rated and non-rated.
   2. Interior Steel frames for wood doors.
   3. Interior Steel framed windows.

B. Related Requirements:
   1. Division 01 Sections – General Provisions
   2. Section 04 20 00 – Unit Masonry
   3. Section 08 14 00 – Wood Doors
   4. Section 08 71 00 – Finish Hardware
   5. Section 08 80 00 – Glazing
   6. Section 09 21 16 – Gypsum Board Assemblies
   7. Section 09 90 00 – Painting

REFERENCE SPECIFICATIONS

A. Work under this section shall be governed by the following specifications, except as modified herein.
   1. Specifications for Custom Hollow Metal Doors and Frames, HMMA 810, of the National Association of Architectural Metal, Manufacturers.
   2. ANSI/DHI A 115 - Specifications for Hardware Preparations in Standard Steel Doors and Frames
   3. ANSI/DHI A 115.IG - Installation Guide for Doors and Hardware
   4. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows
   5. ANSI/NFPA 252 - Standard Methods of Fire Tests of Door Assemblies
   6. ANSI A250.6 – Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
   7. ANSI A250.8 (SDI-100) – Recommended Specifications for Standard Steel Doors and Frames.
   8. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
   9. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames
   10. ANSI/UL 9, Fire Test of Window Assemblies
   11. ANSI/UL 10B, Fire Tests of Door Assemblies
   12. ANSI/UL 10C, Positive Pressure Fire Test of Door Assemblies
   13. ANSI/UL 1784, Air Leakage Tests of Door Assemblies
   14. ASTM A653/A 653 M, Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
   15. ASTM A1011, Specification for Steel, Sheet, and Strip, Hot-Rolled, Carbon, Structural,High Strength Low-Alloy and High Strength Low-Alloy with Improved Formability
   16. ASTM C143, Test Method for Slump of Hydraulic-Cement Concrete
   17. ASTM C1363, Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
   18. ASTM E283, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

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19. ASTM E330, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
20. NAAMM HMMA 820 TN01-03, Grouting Hollow Metal Frames
21. NAAMM HMMA 840, Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames
22. NAAMM HMMA 850, Fire-Rated Hollow Metal Doors and Frames
23. SDI 111, Recommended Details and Guidelines for Standard Steel Doors and Frames and Accessories
24. SDI 112, Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames
25. SDI 117, Manufacturing Tolerances for Standard Steel Doors and Frames
26. SDI 118, Basic Fire Door Requirements

B. Texas Department of Insurance (TDI);
   1. Texas Revisions to the 2018 International Building Code: Windborne Debris Protection.
   2. Windstorm Inspections Program, http://www.tdi.texas.gov/wind/index.html

REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

C. Wind Loads: Provide hollow metal and door hardware assemblies approved by the Texas Department of Insurance, including anchorage, capable of withstanding windload design pressures which are calculated for this project by a registered Architect or Engineer and is part of the construction documents per the Texas Department of Insurance, authorities having jurisdiction and the International Building Code Design Loads per section 1609.

SUBMITTALS

A. General: Submit each item in the Article in accordance with Section 01 33 00.

B. Product Data: For each type of frame, include details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profile, installation instructions and finish.

C. Shop Drawings: Show fabrication and installation of Steel Doors, Windows and Frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware reinforcements and details of joints and connections. Show anchorage and accessory items.

COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

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B. Coordinate access control requirements with Section 08 80 00 Hardware.

MANUFACTURERS

A. Manufacturers listed whose products meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five years experience manufacturing products meeting or exceeding the specifications and comply with Division 1 requirements regarding substitutions to be considered.
   1. Ceco Door, An ASSA ABLOY Door Company
   2. Curries, Division of AADG Inc.
   3. DeanSteel Manufacturing Company, Inc.
   4. Mesker Door, Inc.
   5. Republic Doors and Frames
   6. Steelcraft Mfg. Co. Ingersoll Rand Corp.

DOOR CONSTRUCTION

A. Interior Doors: Interior doors: 1-3/4 inch thick doors with face sheets shall be 16 guage (0.059 in.) minimum thickness and shall be manufactured from cold-rolled steel conforming to ASTM A 1008/A 1008M, or hot-rolled, pickled and oiled (HRPO) steel conforming to ASTM A 1011/A 1011M CS Type B. Steel shall be free of scale, pitting, coil breaks or surface blemishes, buckles, waves or other defects.
   1. For interior areas subject to moisture and high humidity (e.g. kitchen, service areas, locker rooms, showers, etc.) utilize zinc-coated face sheets..

B. Exterior Doors: 1 3/4" thick doors with face sheets shall be 16 guage (0.059 in.) minimum thickness steel.
   1. Thermal Insulated Door: Total insulation U-Value rating of 0.067, R-Value of 14.97 or better measured in accordance with ASTM C1363.

C. Construction:
   1. Doors shall be the types, sizes, and construction, in accordance with the Contract Documents, and shall meet the performance requirements specified herein. Prior to shipment mark each door with an identification number as shown on approved submittal drawings.
   2. Door face sheets shall be joined at their vertical edges by a continuous weld extending the full height of the door with no visible seams on their faces or vertical edges.
   3. Minimum nominal door thickness shall be 1-3/4 in. Door shall be neat in appearance and free from warpage or buckle. Edge bends shall be true and straight and of minimum radius for the thickness of metal used.
   4. Doors shall be stiffened by continuous vertically formed steel sections which, upon assembly,shall span the full thickness of the interior space between door faces. These stiffeners shall be 0.026 in. minimum thickness, spaced so that the vertical interior webs shall be no more than 6 in. apart and securely fastened to both face sheets by spot welds spaced a maximum of 5 in. o. c. vertically. Spaces between stiffeners shall be filled with fiberglass or mineral rock wool batt-type material.
   5. The top and bottom edges shall be closed with a continuous steel channel, not less than .053 in. thickness, welded to both face sheets.
   6. Exterior doors, or where otherwise scheduled by the Architect, shall be closed flush at the top edge. Where required for attachment for weather-stripping, a flush steel closure channel shall also be provided at the bottom edge. Openings shall be provided in the bottom closure channel of exterior doors to permit the escape of entrapped moisture.

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7. Edge profiles shall be provided on both vertical edges of doors as follows, unless hardware dictates otherwise:
   a. Single Acting Doors: Beveled 1/8 in. in 2 in. profile.
   b. Double Acting Doors: Rounded on 2-1/8 in. radius.
8. Hardware Reinforcements and Preparations:
   a. Doors shall be mortised, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier. Where surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware apply, doors shall be reinforced, with drilling and tapping done by others in the field.
   b. Minimum steel thickness for hardware reinforcements shall be as follows:
      1) Full mortise hinges and pivots: 0.167 in.
      2) Lock fronts, strikes, concealed holders, or surface mounted closures: 0.093 in.
      3) Internal reinforcements for other surface applied hardware: 0.067 in.
   c. In cases where electrically or electronically operated hardware is required, and indicated on the approved hardware schedule, conduit, hardware enclosures and/or junction boxes within the door shall be provided. Access plates, where required, shall be the same material and thickness as the door face sheets and shall be fastened with not less than four (4) #8-32 machine screws or #6 sheet metal screws at a spacing not to exceed 12 in. on center. Access plate screws shall be corrosion resistant.
9. Glazing Moldings and Stops:
   a. Where specified or scheduled, doors shall be provided with steel moldings to secure glazing materials furnished and installed in the field by others, in accordance with glazing sizes and thickness shown in the contract documents.
   b. Fixed glass molding shall be welded to the secure side.
   c. Removable glass stops shall be channel shaped, not less than 0.032 in. thickness, with tight fitting butt or mitered corners, and secured with #6 minimum, corrosion resistant countersunk sheet metal screws.
   d. Metal surfaces to which glazing stops are applied, and the inside of the glazing stops shall be treated for maximum paint adhesion and painted with a rust inhibitive primer prior to installation in the door. Glazing stops fabricated from zinc-coated steel conforming to ASTM A 653/A 653M, A40 (ZF120) for interior doors, A60 (ZF180) or G60 (Z180) for exterior openings need not be primed on the inside.
   e. Fire rated doors shall be prepared for listed glazing as required in accordance with the door manufacturer’s fire rating procedure.Accessories:

FRAMES

A. Interior Frame Product: Profiles shall be 0.053 in. minimum thickness. Frame product shall be 0.067 in. minimum thickness for single door openings exceeding 4 ft. in width, and pairs with either door exceeding 4ft. in width.
   1. For interior areas subject to moisture and high humidity (e.g. kitchen, service areas, locker rooms, showers, etc.) utilize zinc-coated frame product as specified under Exterior Frame Product.

B. Exterior Frame Product: Frame product shall be manufactured from zinc coated steel conforming to ASTM A 653/A 653M CS Type B, Coating Designation A60 (ZF180) or G60 (Z180). Profiles product shall be 0.067 in. minimum thickness.

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C. Construction:
1. Frame product shall have integral stops and be welded units of the sizes and types shown on approved submittal drawings. Frame product shall be constructed in accordance with the Contract Documents and meet the performance criteria specified in Section 1.05.B and 1.05 C. Knock down frames are not acceptable. Frame product shall be constructed in accordance with NAAMM HMMA 820 with regard to joint designs and welding techniques. Prior to shipment mark frame product with an identification number as shown on approved submittal drawings.
2. Finished work shall be neat in appearance, square, and free of defects, warps and buckles. Pressed steel members shall be straight and of uniform profile throughout their lengths.
3. Jamb, header, mullion and sill profiles shall be in accordance with the frame schedule and as shown on the approved submittal drawings.
4. Corner joints shall have all contact edges closed tight with faces mitered and stops either butted or mitered.
   a. Welding:
      1) Perimeter face joints (flush or indented) shall be continuously welded internally or externally. Flush face joints shall be finished smooth with seamless faces. Rabbets and soffits shall be continuously welded internally. The use of gussets or splice plates as a substitute for welding shall not be acceptable.
      2) Internal flush face joints shall be continuously welded and finished smooth with seamless faces.
      3) Members at internal indented intersections shall be securely welded to concealed reinforcements, and have hairline face seams.
      4) All other intersection elements shall have hairline seams.
5. Minimum height of stops shall be 0.625 in.
6. Each door opening shall be prepared for single stud, resilient door silencers,three (3) per strike jamb for single door openings, two (2) per head for pairs, except on gasketed or weather stripped frame product. Silencers shall be supplied and installed per hardware schedule.
7. Hardware Reinforcements and Preparations
   a. Frame product shall be mortised, reinforced, drilled and tapped at the factory for templated hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier. Where surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware apply, frame product shall be reinforced, with drilling and tapping done by others in the field.
      1) Full mortised hinges and pivots: 0.167 in. x 1.25 in. x 10 in. length
      2) Strikes: 0.093 in. or 0.053 in. unitized reinforcement with extruded tapped holes that provide equivalent number of threads as 0.093 in.
      3) Flush bolts, closers, hold open arms, and other surface applied hardware: 0.093 in.
8. In cases where electrically or electronically operated hardware is required, and indicated on the approved hardware schedule, conduit, hardware enclosures and/or junction boxes shall be provided. Access plates, where required, shall be the same material and thickness as the frame product and shall be fastened with not less than four (4) #8-32 machine screws or #6 sheet metal screws at a spacing not to exceed 12 in. on center.
9. Floor Anchors:
   a. Floor anchors shall be provided with two holes for fasteners and shall be secured inside jambs with at least four (4) spot welds per anchor.
   b. Where specified or scheduled, adjustable floor anchors, providing not less than 2 in. height adjustment, shall be fastened in place with at least four (4) spot welds per anchor.
   c. For applications that do not permit the use of a floor anchor, an additional jamb anchor shall be substituted at a location not to exceed 8 in. from the base of the jamb.

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d. Floor anchor shall be of same material and thickness as frame.

10. Jamb Anchors:
    a. Frame product shall be provided with anchorage appropriate to frame and wall construction.
    b. Masonry Type:
        1) Frame product for installation in new masonry walls shall be provided with steel adjustable jamb anchors of the strap and stirrup or T-strap type not less than 0.053 in. thickness, or wire type not less than 0.156 in. in diameter. Straps shall be not less than 2 in. x 10 in. in size, corrugated and/or perforated. Jamb anchors shall be placed at a maximum of 18 in. from top and bottom of openings. The minimum number of anchors spaced at maximum 32 in. on center, provided on each jamb, based on the over-all frame height, shall be as follows:
            a. Up to 60 in.: 2 anchors
            b. Greater than 60 in. up to 90 in.: 3 anchors
            c. Greater than 90 in. up to 96 in.: 4 anchors
            d. Greater than 96 in.: 4 anchors plus one for each 24 in. or fraction thereof, spaced at 24 in. maximum between anchors.
    c. Dry Wall Type:
        1) Frame product for installation in dry-wall partitions shall be provided with steel jamb anchors of suitable design, not less than 0.042 in. thickness, securely welded inside each jamb. Jamb anchors shall be placed a maximum of 18 in. from top and bottom of openings. The minimum number spaced at maximum 32 in. on center, provided on each jamb, based on the over-all frame height, shall be as follows:
            a. Up to 60 in.: 3 anchors
            b. Greater than 60 in. up to 90 in.: 4 anchors
            c. Greater than 90 in. up to 96 in.: 5 anchors
            d. Greater than 96 in.: 5 anchors plus one for each 24 in. or fraction thereof, spaced at 24 in. maximum between anchors.
    d. Expansion Bolt Type:
        1) Frame product for installation in existing masonry or concrete walls shall be prepared for expansion bolt type anchors. The preparation shall consist of a countersunk hole for a 0.375 in. diameter flat head bolt and a spacer within the frame profile. The spacer shall be welded to the frame and spaced a maximum of 6 in. from the top and bottom of the frame, with intermediate spacing at a maximum of 26 in. on center. Bolts and shields for such anchors shall be provided and installed by others.
    e. Other Anchor Types:
        1) Frame product to be installed in pre-finished concrete, masonry or steel openings, shall be constructed and provided with anchoring systems of suitable design and quantity as shown on the approved submittal drawings. Fasteners for such anchors shall be provided and installed by others.
11. Frame product for installation in masonry walls with door openings greater than 48 in. in width shall have a steel angle or channel stiffener factory welded into the head, when the head is to be grouted. Such stiffeners shall be not less than 0.093 in. in thickness, not longer than the door opening width, and shall not be used as lintels or load bearing members.
12. Grout guards fabricated from not less than 0.016 in. thick steel shall be provided at hardware mortises on frame product to be grouted.
13. All door openings in frame product shall be provided with a temporary steel spreader welded to the feet of the jambs or mullions to serve as bracing during shipping, and handling, and which shall not be used for installation.
14. Removable Glazing Stops:

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a. Where specified, frame product shall be provided with removable stops to secure glazing material or in-fill panels. Glazing materials shall be furnished and installed in the field by others, in accordance with glazing sizes and thickness shown in the Contract Documents.
b. Removable steel channel glazing stops shall be not less than 0.032 in. thick, butted at corners and secured to the frame section using #6 minimum, corrosion resistant countersunk sheet metal screws.
c. The frame section underneath the glazing stops and the inside of the glazing stops shall be treated for maximum paint adhesion and painted with a rust inhibitive primer prior to installation in the opening. Glazing stops fabricated from zinc-coated steel conforming to ASTM A 653/A 653M, A40 (ZF120) for interior frames, A60 (ZF180) or G60 (Z180) for exterior openings need not be primed on the inside.

FINISHES

A. Interior frames shall be factory primed, then field painted as specified in Division 09 90 00 of these specifications.

B. Exterior frames shall be factory galvanized, type G-60, and primed, then field painted as specified in Division 09 90 00 of these specifications.

HARDWARE

A. Mortise and reinforce for all hardware.

B. Refer to Finish Hardware Division 08 71 00 for templating and hardware types.

INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or as required by standards specified.
1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
a. At fire-rated openings, install frames according to NFPA 80.
b. Install frames with removable stops located on secure side of opening.
c. Install door silencers in frames before grouting.
d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
e. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.

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6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Steel Doors:
      a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
      c. At Bottom of Door: 5/8 inch to 3/4 inch plus or minus 1/32 inch.
      d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
   2. Doors with Thresholds: As required to suit threshold.
   3. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.
   1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 11 00

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SECTION 08 31 00 – ACCESS DOORS AND FRAMES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 -GENERAL

A. Section includes:
   1. Wall access doors.
   2. Ceiling access doors

1.1 RELATED REQUIREMENTS

A. Section 04 20 00 – Unit Masonry
B. Section 08 71 00 – Finish Hardware
C. Section 09 21 16 - Gypsum Board Assemblies
D. Section 09 90 00 - Paints and Coatings
E. Division 16 - Electrical

1.2 SYSTEM DESCRIPTION

A. Design Requirements:
   1. Verification: Obtain specific locations and sizes for required access doors and frames from trades including electrical, requiring access to concealed equipment and indicate on submittal schedule.

1.3 SUBMITTALS

A. Shop Drawings:
   1. Door and panel units: Show types, elevations, thickness of metals, full size profiles of door members.
   2. Hardware: Show materials, finishes, locations of fasteners, types of fasteners, locations and types of operating hardware, and details of installation.
   3. General: Show connections of units and hardware to other Work. Include schedules showing location of each type and size fo door and panel units.

B. Product Data: Manufacturer's technical data for each typ of access door and panel assembly, including setting drawings, templates, finish requirements, and details of anchorage devices.
   1. Include complete schedule, types, locations, construction details, finishes, latching or locking provisions, and other pertinent data.

C. Manufactuer's Installation Instuctions: Indicate installation requirements and rough-in dimensions.

1.4 QUALITY ASSUARANCE

A. Single Source Responsibility: Obtain access door and panel units, and frames for entire Project from (1) single manufacturer.

B. Size Variations: Obtain Architect’s acceptance of manufacturer’s standard size units, which may vary slightly from sizes indicated.

1.5 DELIVERY, STORAGE AND HANDLING

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A. Package and ship per manufacturer's recommendations.

B. Store in dry area out of direct sunlight.

1.6 WARRANTY

A. Warrant materials and worksmanship against defects after completion and final acceptance of Work.
   1. Repair defects, or replace with new materials, faulty materials or workmanship developed during the guarantee period at no expense to Owner.
   2. Access Panel Warranty: 1 year from date of shipment.

PART 2-PRODUCTS

2.1 MANUFACTURERS

A. Specifications and Drawings are based on manufactur's proprietary literature from Elmdor Manufacturing Co. and Best Access Doors Other manufacturers shall comply with minimum levels of material, color selection, and detailing indicated in the Specifications and Drawings.

B. Other Manufacturers include the following:
   1. Acudor Products Inc.
   2. Bar-Co, Inc. Div., Alfab, Inc.
   3. The Bilco Company
   4. Cesco Products.
   5. Nystrom Inc..
   6. JL Industries.
   7. Karp Associates, Inc.
   8. Larsen's Manufacturing Co.
   9. Milcor, Inc.
   11. The Williams Bros. Corporation of America.

C. Substitutions in accordance with Section 01 25 00.

2.2 MATERIALS

A. Zinc-Coated Steel Sheet: ASTM A879/A879M, treatment to prepare surface for painting.

B. Stainless-Steel Sheet: ASTM A240, Type 304 with No. 4 finish according to ASTM A480/ASTM A480M.

C. Aluminum Plate: ASTM B209/B209M.

D. Aluminum Shapes: ASTM B221/B221M.

E. Welding Rods and Bar Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 ACCESS PANELS

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A. Provide one (1) 2 feet-0 inches by 2 feet-0 inches at each toilet room plumbing chase wall. If not shown on drawings, coordinate final location with Architect.

   1. Toilet Room Access doors with exposed trim:
      a. Exposed Frame Flanges: Nominal 1 inch (25 mm) Wide.
      b. Material: 16-gage (1.5-mm) stainless steel.
      c. Door Panels: 14-gage (1.8-mm) stainless steel.
      d. Finish: Type 304 Stainless Steel, #4 Satin.

B. Provide one (1) 36 inch by 36 inch 2-Hour Fire Rated access panel with upward swinging door as shown on drawings. Best Access Door BA-FD2CI

   1. Flush Access Doors with Exposed Trim: Units consisting of frame with exposed trim, door, and hardware, and complying with the following requirements:
      a. Frame: 16-gauge galvannealed steel, with 7/8” trim.
      b. Flange: 7/8” wide for an overall width of 1 1/2".
      c. Door: 16-gauge face with 22-gauge liner and 1-1/2” high-temperature insulation.
      d. Hinge: Concealed continuous piano hinge.
      e. Latch and Locks: 1/4" flush Allen key with a self-latching mechanism.
      f. Material: Satin-finish galvannealed steel with high-quality white powder coat finish

C. Provide one (1) 26 inch by 36 inch 2-Hour Fire Rated Insulated access panel door with exposed flange in elevator shaft. If not shown on drawings, coordinate final location with elevator manufacturer. Best Access Door BA-PFI-24-36

   1. Flush Access Doors with Exposed Trim: Units consisting of frame with exposed trim, door, and hardware, and complying with the following requirements:
      a. Frame: 16-gauge cold rolled steel, 2 1/2" depth.
      b. Flange: 1” exposed flange, cold rolled steel construction
      c. Door: 20-gauge galvanealed steel with reinforced construction.
      d. Hinge: Continuous piano hinge.
      e. Latch and Locks: Self-latching took-key operated slam latch and ring-operated slam latch.
      f. Insulation: 2” thick fire-rated mineral wool

FABRICATION

A. Manufacture each access panel assembly as an integral unit ready for installation.

B. Welded construction: Furnish with a sufficient quantity of 1/4 inch mounting holes to secure access panels to types of supports indicated.

C. Recessed panel: Form face of panel to provide specified recess for application fo finish material. Reinforce panel as required to prevent buckling.

D. Locking Devices: Furnish number of latches required to hold door in flush, smooth plan when closed.
   1. For cylinder lock, furnish 2 keys per lock and key all locks alike.
   2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

PREPARATION

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A. Advise installers of work relating to access panel installation including rough opening dimensions, locations, supports, and anchoring methods. Coordinate delivery with other work to avoid delay.

INSTALLATION

A. Install access door and frame units per manufacturer's written instructions.

B. Install frames plumb and level in opening. Secure rigidly in place.

C. Position units to provide convenient access to concealed Work requiring access.

ADJUST AND CLEAN

A. Adjust panel after installation for proper operation.
B. Remove and replace panels or frames that are warped, bowed, or damaged.

END OF SECTION 08 31 00

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SECTION 08 40 00 – ALUMINUM DOORS, WINDOWS & FRAMES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. Section Includes:
1. Exterior glazed impact resistant aluminum storefront system.
2. Accessories necessary to complete work.
3. Door push and pull hardware.
4. Perimeter sealant.
5. Perimeter flashings.
6. Sub-sill flashing.

B. Related Sections:
1. Section 01 83 12 – Windstorm Rated Construction.
2. Section 04 20 00 – Unit Masonry Assemblies.
3. Section 05 50 00 - Metal Fabrications.
4. Section 06 10 00 – Rough Carpentry
5. Section 07 84 00 – Firestopping.
6. Section 07 92 00 – Joint Sealants
7. Section 08 71 00 – Finish Hardware.
8. Section 08 80 00 – Glazing.
9. Section 09 21 16 – Gypsum Board Assemblies.

REFERENCES

A. Aluminum Association (AA):
1. AA ADM 1 - Aluminum Design Manual.
2. DAF-45 Designation System for Aluminum Finishes.

B. American Architectural Manufacturers Association (AAMA):
1. AAMA/WDMA 101/I.S.2 - Specification for Windows, Doors and Unit Skylights.
2. 501.2 Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
3. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.
4. 606.1 Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
5. 607.1 Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
6. 608.1 Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.
7. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
8. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
9. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.
10. AAMA SFM 1 Aluminum Storefront and Entrance Manual.

C. American Society for Testing and Materials (ASTM):
1. ASTM A36 - Standard Specification for Carbon Structural Steel.

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2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A123/A Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
5. ASTM B221 Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
6. ASTM B308 Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.
7. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
8. ASTM E330 Standard Specification for Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
9. ASTM E331 Standard Specification for Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
10. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential.
11. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
12. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
13. ASTM E1996 - Standard Specification for Performance of Exterior. Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

D. Texas Department of Insurance (TDI):
1. Texas Revisions to the 2018 International Building Code: Windborne Debris Protection.
2. Windstorm Inspections Program, http://www.tdi.texas.gov/wind/index.html

SUBMITTALS

A. Section 01 33 00 - Submittals: Procedures for submittals.

B. Product Data:
1. Submit manufacturer's descriptive literature and product specifications.
2. Include information for factory finishes, hardware, accessories, and other required omponents.
3. Include color charts for finish indicating manufacturer's standard colors available for selection.
4. Provide component dimensions; describe components within assembly, anchorage and fasteners, glass and aluminum composite panels, door hardware, internal drainage details.

C. Design Data: Provide framing member structural and physical characteristics, calculations and dimensional limitations.
1. Texas Licensed Engineer Seal approved by the manufacturer on:
   a. Submittal drawings and engineering calculations.
   b. Modifications and final Record Drawings.

D. Shop Drawings:
1. Submit shop drawings covering fabrication, installation and finish of specified systems.
2. Include following:

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   a. Fully dimensioned plans and elevations with detail coordination keys.
   b Locations of exposed fasteners and joints.
3. Provide detailed drawings of:
   a. Composite members.
   b. Joint connections for framing systems and for entrance doors.
   c. Anchorage.
   d. System reinforcements.
   e. System expansion and contraction provisions.
   f. Glazing methods and accessories.
   g. Internal sealant requirements.
   h. Thermal improvements.
4. Schedule of finishes.

E. Samples:
   1. Submit manufacturer’s standard samples indicating quality of finish.
   2. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
   3. Submit two samples 12 x 12 inches in size illustrating finished aluminum frame.

F. Test Reports: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting. Include other supportive data as necessary.
   1. Provide Miami-Dade Test Notification Number for the assembly.
   2. Provide Texas Department of Insurance Curtain Wall and Storefront System Product Evaluation Report.

G. Qualification Data: Submit installer qualifications verifying years of experience.

H. Manufacturer's Instructions: Submit manufacturer's printed installation instructions.

QUALITY ASSURANCE

A. Mock-Up:
   1. Before installing all door or window units, contractor must install a mock-up of each type of unit being installed.
   2. Architect must approved each mock-up before installation of addition units is allowed. If there is only one unit of a particular stile, its installation shall be approved prior to final caulking.

B. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

C. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

DELIVERY, STORAGE, AND HANDLING

A. Handle Products of this Section in accordance with AAMA - SFM-1 - Aluminum Store Front and Entrance Manual.

B. Protect finished surfaces as necessary to prevent damage.

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C. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.
   1. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
   2. Do not leave coating residue on any surfaces

E. Replace damaged units as required.

MANUFACTURERS

A. Manufacturers"
   1. Kawneer Company Inc. (Basis of Design), www.kawneer.com
   2. YKKAP America, Inc. www.ykkap.com
   3. U.S. Aluminum, www.usalum.com
   4. Oldcastle Buidling Envelope, www.oldcastebe.com

B. Substitutions: Submit under provsions of Section 01 25 00.

MATERIALS

A. Aluminum doors and sections shall be extruded from 6063-T5 aluminum alloy. Finish to be Class II, Clear Anodic Coating conforming with Aluminum Association Standard AAM10C21A44, Kawneer's (**#40 Dark Bronze**)

B. Weather-stripping shall be manufacturer's standard.

C. Refer to Section 08 80 00 for glazing materials.

D. Aluminum entrance doors and frames and windows shall be as manufactured by the Kawneer Company and detailed on the drawings.

E. Hardware at Doors:

   1. Exterior Doors:
      a. All hardware shall be as scheduled in Section 08 71 00 Finish Hardware and installed by Hardware Supplier.
   2. Cylinder guards shall be furnished by door supplier.
   3. Aluminum door supplier shall coordinate with door hardware supplier to ensure proper door and frame preparation.

F. Door construction:

   1. Exterior Doors shall be Kawneer Series IR 500, wide stile.
   2. Top rail and vertical stiles shall be 5" wide with custom bottom rail 12" high. Corner construction shall consist of both sigma deep penetration weld and mechanical fastening.

G. Door frame construction:

   1. Exterior Frame construction shall be Kawneer IR501T, 2 3/4" x 5", members as detailed on drawings.
   2. Install using surround system members as detailed on the drawings.

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3. All screws, miscellaneous fastening devices and internal components shall be of stainless steel, plated or corrosion resistant materials of sufficient strength to perform the functions for which they are used.
4. All frames shall be manufactured with a closed back or with an open back section with “flat aluminum filler” full height at jambs and head. **No open backed frames**.
5. Provide aluminum break metal closer at head to jamb frame transition. Seal and fasten to aluminum frame and frame flat filler at both head and jamb to provide a weather tight seal.
6. Metal “end dams” as manufactured by Kawneer must be used. Shop or field fabricated “end dams” will not be allowed.

H. Window & sidelite frame construction:

1. Interior Window and Sidelite Frame construction shall be Kawneer Trifab VG 451T, 2" x 4 1/2", members as detailed on drawings.
2. Install using surround system members as detailed on the drawings.
3. All screws, miscellaneous fastening devices and internal components shall be of stainless steel, plated or corrosion resistant materials of sufficient strength to perform the functions for which they are used.
4. All frames shall be manufactured with a closed back or with an open back section with “flat aluminum filler” full height at jambs and head. No open backed frames.
5. Provide aluminum break metal closer at head to jamb frame transition and at all vertical mullion to head transitions. Seal and fasten to aluminum frame and frame flat filler at both head and jamb to provide a weather tight seal.
6. Provide alumninum break metal angle at jambs and sills as detailed on drawings.
7. Provide additional jamb and head extensions as required.

I. Break metal:

1. Break metal where shown on the drawings shall be .050 inch anodized aluminum.
2. Install in longest lengths possible with hairline butt joints.
3. Install break metal at all frame transitions as described in section H above.

J. Shims: plastic, aluminum or stainless steel.

ERECTION

A. Units shall be installed plumb, level, and true to plane and shall be secured and anchored in accordance with the detailed shop drawings and manufacturer’s written instructions.

B. Aluminum “end dams” must be installed at ends of all sills at both windows and sidelites.

C. Install all flashings in accordance with manufacturer’s instructions.

D. Set thresholds and exterior frames in bed of mastic and secure. Install stainless steel waterstop beneath thresholds and where frames meet concrete slab as detailed on drawings.

E. Coordinate installation of new door and window frames and doors with Owner who will be installing access control and other security components and wiring under a separate contract and work closely with Owner in adjusting doors for smooth operation after all security wiring and components are installed.

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F. Exterior aluminum doors, windows, and frames must be designed to meet requirements Texas Windstorm Code relative to both wind and impact resistance. Refer to Section 01 83 12 – Windstorm Rated Construction for design requirements. Exterior doors and frames as a system including all fasteners and hardware shall withstand a minimum of 45 PSF wind pressure. Refer to TDI requirements for specific fastener locations.

FIELD QUALITY CONTROL

A. Section 01 43 00 – Quality Control: Field inspection, testing, and adjusting.

B. Inspection will monitor quality of installation and glazing.

C. Water Hose Test in accordance with AAMA 501.2-83, after approximately 500 square feet have been installed; repeat for every 500 sq. ft. installed.

PROTECTION & CLEANING

A. After installation the General Contractor shall take all necessary measures to protect exposed aluminum surfaces and shall be responsible for final cleaning.

B. Remove protective material from pre-finished aluminum surfaces.

C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean exercising care to avoid damage.

D. Remove excess sealant by method acceptable to sealant manufacturer.

END OF SECTION 08 40 00

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SECTION 08 44 13 – ALUMINUM CURTAIN WALLS IMPACT RESISTANT

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. Section Includes:
1. Exterior glazed impact resistant aluminum curtain wall system complete with reinforcing, fasteners, anchors, and attachment devices.
2. Accessories necessary to complete work.
3. Perimeter sealant.
4. Perimeter flashings.
5. Sub-sill flashing.

B. Related Sections:
1. Section 01 83 12 – Windstorm Rated Construction.
2. Section 04 20 00 – Unit Masonry Assemblies.
3. Section 05 50 00 - Metal Fabrications.
4. Section 06 10 00 – Rough Carpentry
5. Section 07 84 00 – Firestopping.
6. Section 07 92 00 – Joint Sealants
7. Section 08 80 00 – Glazing.
8. Section 09 21 16 – Gypsum Board Assemblies.

REFERENCES

A. Aluminum Association (AA):
1. AA ADM 1 - Aluminum Design Manual.
2. DAF-45 Designation System for Aluminum Finishes.

B. American Architectural Manufacturers Association (AAMA):
1. AAMA/WDMA 101/I.S.2 - Specification for Windows, Doors and Unit Skylights.
2. 501.2 Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
3. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.
4. 606.1 Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
5. 607.1 Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
6. 608.1 Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.
7. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
8. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
9. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.
10. AAMA SFM 1 Aluminum Storefront and Entrance Manual.

C. American Society for Testing and Materials (ASTM):
1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

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3. ASTM A123/A Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
5. ASTM B221 Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
6. ASTM B308 Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.
7. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
8. ASTM E330 Standard Specification for Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
9. ASTM E331 Standard Specification for Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
10. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential.
11. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
12. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
13. ASTM E1996 - Standard Specification for Performance of Exterior. Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

D. Texas Department of Insurance (TDI):
   1. 2006 Texas Revisions to the 2006 International Building Code: Windborne Debris Protection.
   2. Windstorm Inspections Program, http://www.tdi.texas.gov/wind/index.html

E. Florida Statewide Windborne Debris Approval Certification:
   1. Miami-Dade County BCCO Protocols PA 201, PA 202 and PA 203.
   2. Florida Building Code Protocols TAS 201, TAS 202 and TAs 203.

SYSTEM DESCRIPTION

A. Aluminum curtain wall systems including tubular aluminum sections with supplementary internal support framing, shop fabricated, factory finished, insulated, impact resistant vision glass, related flashings, anchorage and attachment devices.

B. System Assembly: Shop unitized assembly.

PERFORMANCE REQUIREMENTS

A. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners. A design load shall be calculated in accordance with 2021 IBC and tested in accordance with ASTM E 330. A structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the frame members in excess of 0.2% of their clear spans shall occur.

B. Wind-Borne Debris Loads:
   1. Design and size glass to withstand the following loads:

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a. Glass within 30 feet of Grade: ASTM E1886 and ASTM E1996; large missle impact test.
b. Glass greater than 30 feet above Grade: ASTM E1886 and ASTM E1996; small missle impact test.

2. Provide glazing that when tested with the curtain wall system, shall be FM, Texas Department of Insurance (TDI) and Miami-Dade approved for large missle impact resistance and complies with performance requirements in accordance with South Florida Building Code Test Protocols TAS 201, TAS 202 and TAS 203.

C. Deflection: Limit deflection in any member when tested in accordance with ASTM E 330-90 with allowable stress in accordance with AA Specifications for Aluminum Structures; with full recovery of glazing materials:
1. Without Horizontals: L/175 or 3/4” maximum.
2. With Horizontals: L/175 or L/240 + 1/4" for spans greater than 13’-6” but less than 40’-0”.
3. There shall be no deflection in excess of L/175 of the span of any framing member at design load.

D. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and perifpheral construction, dynamic loading and release of loads, deflection of structural support framing.

E. Thermal Movement: Provide for thermal movement caused by 180 degrees F. surface temperature, without causing buckling stresses on glass, joint seal failures undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

F. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at a reference defferential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.

G. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarly in line with inside pane of glass and inner sheet of aluminum panel and heal bead of glazing compound.

H. Water Leakage (static): None, when measured in accordance with ASTM E331 with test pressure difference of 20 percent of design pressure, with minimum differential of 1.86 lbf/sq maximum of 1200 lbf/sq ft.

I. Water Leakage (dynamic): None, when measured in accordance with AAMA 501.2 as defined in AAMA 502.

J. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F ovver a 12 hour period without causing detrimental effect to system components and anchorage.

K. System Internal Drainage: Drain water entering joints, condensation occuring in glazing channels, or migrating moisture occuring within system, to the exterior by a weep drainage network.

L Thermal and Solar Heat Transmittance of Assembly (U Value and SHGC): Comply with ICC IEEC for climate zone in which project is located:
1. Curtain Wall U-factor: 0.70
2. SHGC (PF <0.25): 0.25

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M. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than 73 and 68 (low-e).

SUBMITTALS

A. Section 01 33 00 - Submittals: Procedures for submittals.

B. Product Data:
   1. Submit manufacturer's descriptive literature and product specifications.
   2. Include information for factory finishes, hardware, accessories, and other required omponents.
   3. Include color charts for finish indicating manufacturer's standard colors available for selection.
   4. Provide component dimensions; describe components within assembly, anchorage and fasteners, glass and aluminum composite panels, door hardware, internal drainage details.

C. Design Data: Provide framing member structural and physical characteristics, calculations and dimensional limitations.
   1. Texas Licensed Engineer Seal approved by the manufacturer on:
      a. Submittal drawings and engineering calculations.
      b. Modifications and final Record Drawings.

D. Shop Drawings:
   1. Submit shop drawings covering fabrication, installation and finish of specified systems.
   2. Include following:
      a. Fully dimensioned plans and elevations with detail coordination keys.
      b Locations of exposed fasteners and joints.
   3. Provide detailed drawings of:
      a. Composite members.
      b. Joint connections for framing systems and for entrance doors.
      c. Anchorage.
      d. System reinforcements.
      e. System expansion and contraction provisions.
      f. Glazing methods and accessories.
      g. Internal sealant requirements.
      h. Thermal improvements.
   4. Schedule of finishes.

E. Samples:
   1. Submit manufacturer’s standard samples indicating quality of finish.
   2. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
   3. Submit two samples 12 x 12 inches in size illustrating finished aluminum frame.

F. Test Reports: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting. Include other supportive data as necessary.
   1. Provide Miami-Dade Test Notification Number for the assembly.
   2. Provide Texas Department of Insurance Curtain Wall and Storefront System Product Evaluation Report.

G. Qualification Data: Submit installer qualifications verifying years of experience.

H. Manufacturer's Instructions: Submit manufacturer's printed installation instructions.

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QUALITY ASSURANCE

A. Single Source Responsibility: Obtain materials for systems from either a single manufacturer or from manufacturer approved by systems manufacturer.
   1. Building Enclosure System: When aluminum curtain wall are part of a building enclosure system, including entrances, entrance hardware, windows, storefront framing and related products, provide building enclosure system products from single source manufacturer.

B. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

C. Manufacturer Qualifications: A manufacturer capable of providing aluminum-framed curtain wall system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

D. Perform Work in accordance with AAMA SFM-1 and manufacturer's written instructions.

DELIVERY, STORAGE, AND HANDLING

A. Handle Products of this Section in accordance with AAMA - SFM-1 - Aluminum Store Front and Entrance Manual and MCWM-1 Curtain Wall Manual #10..

B. Protect finished surfaces as necessary to prevent damage.

C. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.
   1. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
   2. Do not leave coating residue on any surfaces

E. Replace damaged units as required.

PROJECT CONDITIONS

A. Field Measurements:
   1. Verify actual locations of structural supports for glazed aluminum curtain walls by field measurements before fabrication.
   2. Indicate measurements on shop drawings.

WARRANTY

A. Submit manufacturer's standard warranty for owner's acceptance.

B. Warranty Period:
   1. Two years from Date of Substantial Completion of the project provided however that in no event shall the Limited Warranty begin later than six months from date of shipment by manufacturer.

MANUFACTURERS

A. Manufacturers
   1. Kawneer Company Inc.(Basis of Design) www.kawneer.com

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2. Oldcastle Buidling Envelope, www.oldcastebe.com
3. YKKAP America, Inc. www.ykkap.com
4. U.S. Aluminum, www.usalum.com

B. Substitutions: Submit under provsions of Section 01 25 00.

MATERIALS

A. 1600 Wall System®1 Curtain Wall impact resistant (IR):
   1. Sight line: 2-1/2" (63.5 mm)
   2. Outside-glazed pressure plate format
   3. System depth:
      a. 7-13/16" (198.4 mm) for 1-5/16" (33.3 mm) insulating glazing

B. Aluminum Extrusions:
   1. Alloy and temper recommended by glazed aluminum curtain wall manufacturer for strength, corrosion resistance, and application of required finish
   2. Not less than 0.070" (1.8 mm) wall thickness at any location for the main frame
   3. Complying with ASTM B221: 6063-T6 alloy and temper

C. Aluminum Sheet Alloy:
   1. Shall meet the requirements of ASTM B209.

D. Fasteners:
   1. Aluminum, nonmagnetic stainless steel or other materials must be non-corrosive and compatible with aluminum members, trim hardware, anchors, and other components.

E. Anchors, Clips, and Accessories:
   1. Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.
   2. Anchors, clips, and accessories shall provide sufficient strength to withstand the design pressure indicated.

F. Pressure Plate:
   1. Pressure plate shall be aluminum.
   2. Pressure plate shall be fastened to the mullion with stainless steel screws.

G. Reinforcing Members:
   1. Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.
   2. Reinforcing members must provide sufficient strength to withstand the design pressure indicated.

H. Sealant:
   1. For sealants required within fabricated curtain wall system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

I. Thermal Barrier:
   1. Thermal separator shall be extruded of a silicone compatible elastomer that provides a minimum 1/4" (6.3 mm) separation.

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J. Tolerances:
   1. References to tolerances for wall thickness and other cross-sectional dimensions of glazed curtain wall members are nominal and in compliance with AA Aluminum Standards and Data.

CURTAIN WALL FRAMING

A. Framing Members:
   1. Manufacturer's standard extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads
   2. Glazing System: Four-sided captured
   3. Glazing Plane: Front

B. Glass:
   1. Insulating glass options:
      a. 1" (25.4 mm)
      b. 1-5/16" (33.3 mm)

C. Brackets and Reinforcements:
   1. Manufacturer's standard high-strength aluminum with non-staining, non-ferrous shims for aligning system components.

D. Framing Sealants:
   1. Shall be suitable for glazed aluminum curtain wall as recommended by sealant manufacturer.

E. Fasteners and Accessories:
   1. Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories must be compatible with adjacent materials.
   2. Where exposed, fasteners and accessories shall be stainless steel.

F. Perimeter Anchors:
   1. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

G. Packing, Shipping, Handling, and Unloading:
   1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

H. Storage and Protection:
   1. Store materials so that they are protected from exposure to harmful weather conditions.
   2. Handle material and components to avoid damage.
   3. Protect material against damage from elements, construction activities, and other hazards before, during, and after installation.

FINISH

A. Finish designations that are prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:
   1. Kawneer Permanodic® AA-M10C21A44, AAMA 611, Architectural Class I Color Anodic Coating (Color **#40 Dark Bronze**)

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ERECTION

A. Install in accordance with manufacturer's instructions and applicable provisions of AAMA Aluminum Curtain Wall Design Guide Manual

B. Align assemblies plumb and level, free of warp or twist, aligning with adjacent Work.

C. Tolerances:
   1. Limit variations from plumb and level:
      a. 1/8 inch in 20'-0" vertically and horizontally.
      b. 1/4 inch in 40'-0" either direction.
   2. Limit offsets in theoretical end-to-end and edge-to-edge alignment:
      a. 1/16 inch where surfaces are flush or less than 1/2 inch out of flush and separated by not more than 2 inches.
      b. 1/8 inch for surfaces separated by more than 2 inches.
   3. Step in face: 1/16 inch maximum.
   4. Jog in alignment: 1/16 inch maximum.
   5. Location: 1/4-inch maximum deviation of any member at any location.
   6. Tolerances are not accumulative.

D. Provide attachments and shims to permanently fasten system to building structure.

E. Anchor securely in place, allowing for required movement, including expansion and contraction.

F. Separate dissimilar materials at contract points, including metal in contact with masonry or concrete surfaces, with protective coating or preformed separators to prevent contact and electrolytic action.

G. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weathertight construction.

H. Do not apply mullion covers until building is closed in, roofing is installed and no alkaline substances can be washed from building onto curtain wall system.

I. Exterior aluminum curtain walls must be designed to meet requirements Texas Windstorm Code relative to both wind and impact resistance. Refer to Section 01 83 12 – Windstorm Rated Construction for design requirements. Refer to TDI requirements for specific fastener locations.

FIELD QUALITY CONTROL

A. Section 01 43 00 – Quality Control: Field inspection, testing, and adjusting.

B. Inspection will monitor quality of installation and glazing.

C. Water Hose Test in accordance with AAMA 501.2-83, after approximately 500 square feet have been installed; repeat for every 500 sq. ft. installed.

PROTECTION & CLEANING

A. After installation the General Contractor shall take all necessary measures to protect exposed aluminum surfaces and shall be responsible for final cleaning.

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B. Remove protective material from pre-finished aluminum surfaces.

C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean exercising care to avoid damage.

D. Remove excess sealant by method acceptable to sealant manufacturer.

END OF SECTION 08 40 00

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SECTION 08 70 00 – FINISH HARDWARE

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. This section includes the purchace and delivery to the jobsite of the finish hardware for all doors and door openings, except those which are furnished under other section of the work. The labor for installing the hardware furnished under this section shall be included in the Contractor's Bid.

B. General – this section includes items known commercially as finish or door hardware that are required for swing, sliding, overhead and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed. This section includes (but is not limited to) the following:

1. Hinges and pivots
2. Key control system
3. Lock cylinders and keys
4. Lock and latch sets
5. Bolts and coordinators
6. Exit devices
7. Push/pull units
8. Closers, door control devices, and electromagnetic hold open devices
9. Stops and overhead holders
10. Door trim units
11. Protection plates
12. Weatherstripping, fire, and smoke seals
13. Astragals and meeting seals on pairs of doors
14. Thresholds, gasketing, and door bottoms
15. Miscellaneous devices
16. Electrified hardware devices, controls, power supplies, transfers, and wiring diagrams

C. Related sections – contain requirements that relate to this section (but are not limited to those listed):

1. Division 00 and 01 section(s) for sustainable material requirements, windstorm/hurricane code compliance, and blast resistance.
2. Division 06 section(s) for interior architectural woodwork cabinet hardware.
3. Division 08 and 10 section(s) for all opening hardware requirements including but not limited to coordination and matching efforts, template requirements, and keyed security.
   a. All hardware for aluminum storefront swinging doors shall be supplied by this section’s Supplier if not specifically specified in aluminum storefront section.
   b. All cylinders for locks on overhead type doors, folding doors, wire-mesh sliding doors, accordion type doors, and gates to be provided under this section, unless specifically called out to be provided by others in respective sections.
   c. All “hardware preps” must be covered in the door/frame supplier’s bid. The pricing for finish hardware only covers the products within this document, not the doors/frames respective cutouts/mortise/surface prep required for these items.
4. Division for access control, fire alarm integrated systems, electrical provisions, and radiation / radio frequency shielding requirements for hardware.

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REFERENCES

A. Texas Accessibility Standards (TAS) of the Architectural Barriers Act, Article 9102, Texas Civil Statutes, effective April 1, 1994 and administered by the Texas Department of Licensing and Regulation (TDLR), P.O. Box 12157, Austin, Texass, 7811, phone (512)463-3211, Fax (512475-2886.
B. ANSI-A117.1. American National Standards Institute – “Accessible and Usable Buildings and Facilities”.
C. ANSI/BHMA-156 Series. American National Standards Institute/Builders Hardware Manufacturing Association – “Builders Hardware Standards”.
D. ANSI A250.13. American National Standards Institute – “Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies.”
E. ASTM E330/E1886/E1996. American Society for Testing and Materials – “Uniform Static Air Pressure Difference” / “Cyclic Pressure Differentials”/ “Impacted by Windborne Debris in Hurricanes”.
F. IBC. International Building Code.
G. NEC. National Electrical Code.
H. NFPA-80. National Fire Protection Agency – “Standard for Fire Doors and Windows”.
I. NFPA-101. National Fire Protection Agency – “Life Safety Code”.
J. State and Local Codes including Authority Having Jurisdiction.
K. UFAS. Uniform Federal Accessibility Standards.
L. UL. Underwriter’s Laboratories Testing Services.
M. UL-10C. Underwriter’s Laboratories – “Positive Pressure Tests of Door Assemblies”.
N. WHI. Warnock Hersey International Testing Services.

HARDWARE SUPPLIER RESPONSIBILITIES

A. Under the direction of Architect to:
    1. Key meetings - attend a minimum of two (2) key meetings per project at the location selected by Owner.
    2. Tagging and indexing - tag all keys with permanent tags and assemble key cabinet, and set up electronic cross index system.
    3. Pre-install meeting – provide a pre-installation training meeting for hardware Installer(s) and General Contractor at the job site one (1) week prior to installation of finish hardware.
    4. Instruct Owner – provide a minimum of four (4) hours of key control instructions per project for training Owner’s personnel in the proper adjustment and maintenance of door hardware and hardware finishes at project conclusion training.
    5. Install cores - permanent cores to be installed under the direct supervision and presence of Supplier and Owner's maintenance personnel.
    6. Certify install – at the completion of all work, with Installer(s), General Contractor, and manufacturer’s representative(s), inspect and supervise the adjustment of any piece of hardware not operating or installed correctly, certify in writing that all hardware has been installed per manufacturer’s requirements, and provide a written punch list directly to Architect of all outstanding items not completed.
    7. Follow-up inspection – approximately six (6) months after the date of substantial completion, meet with representatives of the General Contractor, Installer(s), Owner, and lock, exit, and closer manufacturers, at project site for the following:

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a. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.

b. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.

c. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.

d. Prepare a written report for Owner and Architect of current and predictable problems (of substantial nature) in the performance of the hardware.

SUBMITTALS

A. Submittals – submit the following in accordance with conditions of contract and Division 01 specification sections within two (2) weeks of receipt of an executed purchase order and contract documents.
   1. Product data – manufacturer's technical data for each item of door hardware, installation and mounting instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
      a. Include templates for doors, frames, and other work specified to be factory prepared for the installation and preparation of door hardware. Contractor to check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
   2. Schedule layout – coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   3. Schedule content – based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of each item required for every door or opening. Include the following information:
      a. Type, style, function, size, and finish of each hardware item.
      b. Model name and manufacturer of each item.
      c. Fastenings and other pertinent information.
      d. Location of each hardware set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.
      e. Explanation of all abbreviations, symbols, and codes contained in schedule.
      f. Mounting locations for hardware.
      g. Degree of opening required for all doors with closers.
      h. Door and frame handing, sizes, and materials
      i. Keying information.
      j. Supplier performance responsibilities.
4. Samples – as requested by Architect for each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule.
   a. Samples will be returned to supplier. Units that are acceptable and remain undamaged though submittal, review, and field comparison process may, after final check of operation, be incorporated in the work, within limitations of keying coordination requirements.
5. Electronic security hardware – coordinate the installation of electronic security with Architect and provide installation and technical data to Architect and other related sub-contractor(s).
   a. Provide complete wiring diagrams for each opening requiring electrified hardware, except openings where only magnetic hold-opens are specified. Provide a copy with each hardware schedule submitted after approval. Provide a copy with delivery of hardware to job site and another copy to Owner at time of job completion.

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B. Finals – supply the approved schedule and templates for all finish hardware within two (2) weeks of receipt of approved submittal for use by Architect, General Contractor, and affected supplier(s) for all other products. Include with schedule the product data,samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.

C. Keying submittal - submit separate keying schedule with detailed electronic and paper copies of key structure indicating clearly how Owner's final instructions on keying of locks have been fulfilled.

QUALITY ASSURANCE

A. Single source responsibility – obtain each type of hardware for latch and lock sets, hinges, closers, exit devices, and flat goods from a single manufacturer.

B. Supplier qualifications – a recognized architectural door hardware supplier, that has exact knowledge and experience with Owner’s current material hardware requirements and supplier performance requirements, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this project, and that employs an experienced hardware consultant who is available to Owner, Architect, and Contractor as requested at reasonable times during the course of the work, for consultation at the jobsite.

C. Fire-rated openings – provide door hardware scheduled or required for fire-rated openings that complies with UL, NFPA-80, and requirements of Authority Having Jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, Factory Mutual or other testing and inspecting organization acceptable to Authority Having Jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.
   1. All required finish hardware components of a fire-rated opening shall be incorporated into any door assembly located within a fire-rated partition.
   2. Doors and frames used in positive pressure opening assemblies shall meet IBC and UL-10C in areas where this specification includes gasketing for smoke rated openings.

D. General compliance – Supplier to certify and submit documentation that all hardware supplied complies with all Federal ADA, State TAS, Local IBC Code, Fire Life Safety Code, and additional requirements of doors. Provide a complete list of discrepancies and possible solutions to any opening not meeting requirements.

DELIVERY, STORAGE, AND HANDLING

A. Packaging – door hardware is the responsibility of Supplier. As material is received by Supplier from various manufacturers, sort, tag, and repackage in containers clearly marked with appropriate hardware set number or correct item code to match set numbers or item code of approved hardware schedule. Include basic installation instructions with each item or package.

B. Delivery – Supplier to deliver packaged door hardware items promptly to location as directed by General Contractor.

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C. Inventory – General Contractor to inventory door hardware jointly with representatives of Supplier and Installer(s) at job site at delivery until each is satisfied that count of the delivery is correct.

D. Site control – General Contractor to provide secure lock-up for door hardware delivered but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the work will not be delayed by hardware losses both before and after installation. Replace any hardware lost or misplaced at own expense to meet construction schedule.

MAINTENANCE

A. Supplier to furnish a complete set of as-built hardware schedule, installation instructions, specialized tools, and maintenance instructions for all products supplied for Owner's continued adjustment, maintenance, and removal and replacement of door hardware at the Owner key control training. Final payment will not be released until this item has been completed fully.

WARRANTY

A. All finish hardware shall be supplied with a minimum two (2) year warranty against defects in materials and workmanship commencing with substantial completion of the project except as follows:
   1. All closers to have a minimum ten (10) year written warranty.
   2. All exit devices to have a minimum five (5) year written warranty.
   3. All locksets to have a minimum five (5) year written warranty.

PRODUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   1. Hinges:
      a. Ives

   2. Cylinders and with interchangeable cores:
      a. Schlage Primus (FSIC)
      *NO SUBSTITUTION

   3. Key cabinet:
      a. Lund
      b. Telkee, Inc.
      c. MMF Co.

   4. Locks and latches:
      a. Schlage ND series
      *NO SUBSTITUTION

   5. Exit and panic devices:
      a. Von Duprin
      *NO SUBSTITUTION

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6. Closers
   a. LCN
   *NO SUBSTITUTION

7. Push/Pull trim, protection plates, bolts, and other auxiliary hardware:
   a. Ives

8. Weatherstripping, seals, astragals and thresholds:
   a. Zero

9. Access Control:
   a. Card Reader – By Division 28
   b. Power Supply – By Division 28
   c. Door Position Switches – By Division 28

MATERIALS AND FABRICATION

A. Base metals – produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units as determined by respective ANSI/BHMA A156 series standards for each type of hardware item and by ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods other than those indicated, except as otherwise specified.

B. General fasteners – provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
   1. Furnish screws for installation with each item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish, or if exposed in surfaces of other work, to match finish as closely as possible including "prepared for paint" surfaces to receive painted finish.
   2. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use through-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means to fasten the hardware securely. Where through-bolts are used as a means of reinforcing the work, provide sleeves for each though-bolt or use sex screw fasteners.

HINGES, BUTTS, AND PIVOTS

A. Locations – except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units. For fire-rated doors provide steel or stainless steel bearing type. Tips shall be flat button and matching plug, finished to match leaves, except where hospital tips (HT, Ives) are indicated. Provide ball bearing on all of the following door types: high frequency, exterior non-means of egress, doors with closers, restrooms, fire-rated, and sound sealed doors.

B. Sizes – except as otherwise indicated, provide hinges as follows: 5 knuckle heavy duty full mortise template type 4.5" x 4.5" standard weight for all 1-3/4" doors up to and including 3'4" wide. For all doors over 3'4" wide, provide 5" x 4.5" heavy weight hinges. For all doors over 1-3/4" through 2" thick provide 5" x 5" hinges.

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C. Number of hinges – provide number of hinges indicated, but not less than one (1) continuous or three (3) mortise butt hinges per door leaf for doors 90” (86” at fire-rated doors) or less in height and one (1) additional hinge for each 30” of additional height.

D. Screws – provide Phillips flat head screws complying with the following requirements with screw head finish to match surface of hinges or pivots:
   1. Metal doors and frames – install machine screws into drilled and tapped holes or self-drilling screws on continuous hinges.
   2. Non fire-rated wood doors and frames – install wood screws.
   3. Fire-rated wood doors – install #12 x 1-1/4”, threaded-to-the-head steel wood screws.

LOCK CYLINDERS AND KEYING

A. Keying system – equip locks with cylinders for interchangeable core pin tumbler inserts. Provide temporary construction cores for all keyable devices for theconstruction period; Supplier to remove and replace with permanent cores when directed. Provide final cores and keys for installation by Supplier.

B. Key ways – provide all lockable devices with keyway to be compatible with Owner’s existing restricted keying structure requested that comply with performance requirements for Grade 1 as listed in ANSI/BHMA A156.5, have been tested for pick and drill resistance requirements of UL 437, and which are UL listed for fire resistance.

C. Key structure – comply with Owner’s instructions for master keying, and, except as otherwise indicated, provide individual change keys for each lock that is not designated to be keyed alike with a group of related locks. All interchangeable cores shall be stamped with the appropriate keying symbol for that core. Reference section HARDWARE SUPPLIER RESPONSIBILITIES for key meeting requirements.
   1. Permanently inscribe each key with cylinder manufacturer’s key symbol and notation “DO NOT DUPLICATE”.
   2. Provide concealed key control on all cores.

D. Key material – provide keys of nickel silver only.

E. Key quantity – provide three (3) change keys for each lock, five (5) master keys for each master system, and five (5) grandmaster keys for each grandmaster system, or in quantities as directed by Owner at the key meeting for multi-use rooms.
   1. Provide one (1) extra key blank for each lockable device.
   2. Provide ten (10) extra zero bitted cores.
   3. Provide key quantities equal to 125% of all classrooms for staff common use rooms.
   4. Provide two (2) additional copies of all master keys directly to Owner or district.

F. Cylinder housing and cores – provide for all keyable exit device trim and applicable keyed options, keyed removable mullions, aluminum storefronts, overhead, accordion, wire partitions, package doors, and folding doors as required by each specific door or hardware type.

G. Key cabinet – provide key cabinet(s) including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with

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capacity for 150% of the total number of keyable devices required for the project. Provide hinged-panel type cabinet(s) for wall mounting. Reference section HARDWARE SUPPLIER RESPONSIBILITIES for tagging and indexing requirements.

H. Electronic index – provide complete electronic cross index system. Index to include architectural door mark number, key symbol, bitting, tag number, Owner's door designation name or number, and number of keys provided.

LOCKS, LATCHES, BOLTS, ASTRAGALS, AND EXIT DEVICES

A. Locks and latches – All locks shall have passed over 3 million cycle test and Supplier shall provide test data for verification at submittal. Provide locks and latches with function as required per room. Provide on all doors without push/pulls, exit devices, hospital latches, and flush bolts. Latch guard shall be provided on all reverse handed exterior doors with locksets. Latch guard shall be provided in models as required for door material type, lock strike dimensions, and thru-bolted.
   1. Lock functions – lever design shall be LL lever design. Default to a single keyed function (office, classroom, or storeroom) if required function for any opening is in question. Where rabbet door stiles are indicated, provide special rabbet front on locks and latch units and bolts.
   2. Strikes – provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.
      a. Provide extra long strike lips for locks used on frames with applied wood or aluminum casing trim.
      b. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
      c. Provide standard strike plates for interior doors of residential units where wood door frames are used.
   3. Lock throw – provide ½" minimum latch throw for other bored and pre- assembled locks and ¾" minimum latch throw for mortise locks. Provide 5/8" minimum latch throw on pairs of doors. Provide 1" minimum throw for all dead bolts. Comply with UL requirements for throw of bolts and latch bolts on fire- rated openings.
   4. Lock backset – provide standard commercial backset. Adjust backset as required for coordination with surface applied hardware which would prohibit standard backset application.

B. Flush bolts, overlapping astragals, and coordinators – provide minimum of ½" diameter rods of brass, bronze, or stainless steel with minimum 12" long rod for inactive leaf of pairs up to 7'0" in height. Provide longer rods as necessary for doors exceeding 7'0" in height. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.

C. Exit devices – provide lockable lever trim panic devices on all means of egress doors, door exiting from rooms of assembly, electrical closets that contain more than 1200 amps as required by NEC, and ALL reverse handed doors from locker rooms. Provide with device style, lever design to match lock levers, fire-rating, windstorm-rating, and sized per door height and width requirements. Provide double egress doors with panic devices with non-lockable trim. Provide all required components to insure all labeling and code requirements are satisfied. Provide shims where devices are required to span across glass lites which would interfere with level installation. All devices shall be though-bolted with sex bolts to the door and contain a sound deadening feature. Provide non-rated openings with keyed cylinder

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dogging to keep latch bolt retracted when engaged and with visual indication of dogging status. Pairs of doors at locations with mullion to have mullions equipped with “keyed cylinder” option and be furnished with mullion storage kits and applicable mullion stabilizers.

PUSH/PULLS AND HOSPITAL LATCHES WITH ADDITIONAL DEADBOLTS

A. Provide push/pulls on all non-rated entry foyer, atrium, multi-use restrooms, kitchen to serving, cafeteria/dining to serving, straight handed locker room doors. Provide hospital latches on rated doors in lieu of push/pulls unless doors are a means of egress. Provide all doors with push/pulls or hospital latches with a classroom deadbolt. Provide manufacturer’s standard exposed fasteners for installation.

CLOSER AND DOOR CONTROL DEVICES

A. Manual closers – provide with full covers on all door openings in fire/smoke rated partitions, means of egress, elevator machine rooms, electrical rooms, interior storage rooms over one-hundred square feet, rooms with sound seals, all rooms with a toilet, and exterior conditions except for mechanical and storage rooms. Provide closers at all corridor doors, except non-rated classrooms.
   1. Special considerations – closers shall be added to all out-swinging doors in exit access or secondary communicating corridors (corridors other than exit access). Doors swinging from secondary communicating corridors shall require closers if:
      a. Doors and/or partitions are indicated as fire-rated.
      b. Room function defined elsewhere in this specification requires a closer.
      c. The corridor provides egress travel to an exit access for an occupant load greater than fifty (50) persons.
   2. Sizes of units – except as otherwise specifically indicated furnish “multi-sized” closers with “barrier-free delayed closing” option to meet ADA and TAS requirements. Where manual closers are indicated for all doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing where indicated. Provide mounting brackets suitable for the style and swing of the door. Installer shall mount all closers on room side unless instructed otherwise by Architect. On doors with coordinators provide mounting brackets to span the coordinator. On aluminum storefront doors provide a drop mounting plate to accommodate the narrow top rail, if required.

B. Electro-magnetic holders – provide units designed to hold door in open position under normal usage and to release and close door automatically under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL 288 listed fire detectors, provided with normally closed switching contacts.

DOOR TRIM AND PROTECTION UNITS

A. Edge trim – stainless steel to fit door thickness and 36” in height at kitchen to serving and custodial closets.

B. Protection plates – fabricate face protection plates not more than 1-1/2” less than door width on push side of door by height indicated on single doors and 1” on each leaf for pairs. Provide protection plates for all doors with closers a minimum of 10” height, except provide 36” height at non-rated custodial closets and kitchen to serving. All metal protection plates to be of

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stainless steel, 0.050” thick. (U.S. 18 gage). Provide manufacturer’s standard exposed fasteners for door trim units consisting of either matching screws or self-tapping screws.

WEATHERSTRIPPING AND SEALS

A. Provide continuous weatherstripping on all exterior, mechanical room, and electrical room doors. Provide light or sound seals on light or sound sensitive doors. Provide non- corrosive fasteners for exterior applications. Size weatherstripping and seals to opening size. Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
   1. Weatherstripping at exterior jambs, mullions, and heads – provide bumper-type resilient insert and metal retainer strips, surface applied unless shown as mortise or semi-mortised, and of the following metal finish and resilient bumper material. Extruded aluminum with natural anodized finish, manufacturer’s standard color selections, or finish to match. Minimum 0.062” thickness of main walls and flanges.
   2. Smoke seals – provide at interior openings as required by IBC on 3 sides to accommodate door sizes for all fire-rated doors and elevator machine rooms. Intumescent fire seals on 3 sides to accommodate door sizes for all fire-rated wood doors over 20 minute fire-ratings to meet IBC requirements if wood door specification does not require seals to be built into the edges of doors.
   3. Silencers – all doors not utilizing seals should be provided with mutes in design as required by frame manufacturer.
   4. Sound seals – provide at sound sensitive doors.
   5. Light seals – provide at light sensitive doors.

THRESHOLDS AND DOOR BOTTOM SWEEPS

A. Except as otherwise indicated, provide standard metal threshold unit of type, size, and profile required at all exterior, mechanical, electrical, and interior doors separating non- conditioned and conditioned spaces. Provide units that meet ADA and TAS requirements. Undercut on doors to be adjusted to function as intended with applicable thresholds. Provide rain drips for all frames exposed directly to rain (no overhang on building).
   1. Thresholds and door bottom sweeps – provide threshold consisting of metal, design, and finish sized to entire opening width. Extruded aluminum with color anodized finish as selected from manufacturer’s standard color, range, natural, or finished to match. Provide units not less than 4” wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit entire door width. Provide units with saddle threshold and exterior surface mounted door bottom drip-sweep combination unit.
   2. Drip cap – provide with width four (4)” wider than the size of the door at locations indicated.

DOOR STOPS, VIEWERS AND COAT HOOKS

A. Door stops – provide wall stops at all doors that can open without hitting an obstruction and where a wall exists within the width of the door at 180° of open. At all exterior non-means of egress doors, provide overhead surface mounted stops and with a hold- open feature. At exterior means of egress doors provide a heavy-duty floor stop projecting into the floor. This requirement is in addition to all closer requirements.

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B. Viewers – provide door viewers at all kitchen vendor back door entrances and where indicated by plans. Mount door viewer(s) to allow a minimum 180° viewing angle.

C. Coat Hooks – provide coat hooks at all stall doors if not provided by toilet accessory or toilet partition suppliers.

HARDWARE FINISHES

A. Acceptable finishes – plated Satin Chrome, painted, and powder coated. Powder coated in similar finish is acceptable on closers. Anodized equal is acceptable where plating is not available or the commercially recognized standard. If finish selected above cannot be directly matched by product, a similar finish or paintable finish shall be provided.
   1. General – provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with the manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
   2. Standard – The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes", including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
      a. Provide finishes that match those established by BHMA or, if none established, match Architect's sample.
   3. Lacquers – provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "- NL" is used with standard finish designations to indicate "no lacquer".

B. Matching and coordination – match items to the manufacturer's standard color and texture finish for the latch and locksets (or push/pull units if no latch/locksets).
   1. Hardware components for storefront/specialty doors shall be coordinated with Architect/Owner and are to be compatible to the door finish as indicated in respective section(s), regardless of finish designations indicated herein.

INSTALLATION

A. Pre-Install meeting – please reference section HARDWARE SUPPLIER RESPONSIBILITIES for pre-installation meeting requirements.

B. Standards – mount hardware units at heights indicated in the following applicable publications, except as specifically indicated by Architect or required to comply with governing regulations:
   1. Door Hardware Institute – "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" and "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames".
   2. Texas Accessibility Standards & Americans with Disabilities Act mounting heights. When these two standards conflict, notify Architect and/or AHJ before installation of product.

C. Coordination – install each hardware item in compliance with the manufacturer's instructions and recommendations and hardware submittal requirements.
   1. General – set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation
   2. Painting/Finishes – where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal,

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storage, and reinstallation or application of surface protection with finishing work specified in Division 09 “Paintings and Coatings”. Do not install surface mounted items until finishes have been completed on the substrates involved. Remove all protective film prior to installation of mounting screws. Protect all finishes as required during construction to maintain original finish

3. Fasteners – drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
4. Thresholds – set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements in Division 07 “Joint Sealers”.
5. Weatherstripping – comply with manufacturer’s instructions and recommendations to the extent installation requirements are not otherwise indicated for weatherstripping and seals.

D. Electronic hardware – upon completion of any electronic security hardware installation, Contractor to verify that all components are working properly and state in the required guarantee that this inspection has been performed.

E. Permanent core install and certify install - reference section HARDWARE SUPPLIER RESPONSIBILITIES for permanent core installation and certification of installation requirements.

ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjusting – adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
   1. Where door hardware is installed more than one (1) month prior to acceptance or occupancy of a space or area, Installer(s) shall return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

B. Cleaning – clean adjacent surfaces soiled by hardware installation. Clean all hardware finishes and return to new condition or replace prior to Owner’s occupancy.

C. Instruct Owner and Follow-up – please reference section HARDWARE SUPPLIER RESPONSIBILITIES for demonstration/follow-up requirements.

MEANS OF EGRESS DOORS

A. All door openings that have an “EXIT” sign as indicated on the electrical drawings.

HARDWARE SETS

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HEADINGS

Heading: 00

7 Marks:
A101C, B103C, B101, C103B, C101, D103B, D101

Each Opening To Have:

1	CASED OPENING	NO HARDWARE		

Heading: 01

14 Marks:
A102A, A101A, A100B, A100A, B104A, B103A, B102B, B102A, C103A, C102B, C102A, D103A, D102B, D102A

Each Opening To Have:

3	HINGE, 4 1/2, STD WT	5BB1 X 4.5 X 4.5	652	IVE
1	CYLINDRICAL DEAD LOCK	B663HD X 12-631 X 10-094 X BRN X 50-231	626	SCH
1	CYLINDER CORE	20-740.626.MK	626	SAN
1	PUSH PLATE	8200 X 4 X 16	US32D	IVE
1	PULL PLATE	8303-0 X 4 X 16	US32D	IVE
1	CLOSER	4040XP.RWPA.689.TBSRT	689	LCN
1	KICK PLATE	8400 10 X 34 X B-CS	US32D	IVE
1	DOOR BOTTOM	FAS-SEAL DOOR SWEEP		CUST DB
1	THRESHOLD	546A X 36		ZER
1	DRIP CAP	142AA X 40		ZER
1	GASKETING, CATEGORY G	188S-BK 17’ PSA		ZER
1	WALL STOP	WS406/407-CCV	US32D	IVE

Heading: 02

6 Marks:
A102B, A101B, B104B, B103B, C104, D104

Each Opening To Have:

3	HINGE, 4 1/2, STD WT	5BB1 X 4.5 X 4.5	652	IVE
1	CYLINDRICAL DEAD LOCK	B663HD X 12-631 X 10-094 X BRN X 50-231	626	SCH
1	CYLINDER CORE	20-740.626.MK	626	SAN
1	PUSH PLATE	8200 X 4 X 16	US32D	IVE
1	PULL PLATE	8303-0 X 4 X 16	US32D	IVE
1	CLOSER	4040XP.RWPA.689.TBSRT	689	LCN
1	KICK PLATE	8400 10 X 34 X B-CS	US32D	IVE
1	DOOR BOTTOM	FAS-SEAL DOOR SWEEP		CUST DB
1	THRESHOLD	566A X 36		ZER
1	DRIP CAP	142AA X 40		ZER
1	GASKETING, CATEGORY G	188S-BK 17’ PSA		ZER

Heading: 03

3 Marks:
B100, C100, E200,

Each Opening To Have:

3	HINGE, 4 1/2, STD WT	5BB1 X 4.5 X 4.5	652	IVE

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1	CYLINDRICAL DEAD LOCK	ND10S X SPA X 12-247 X 10-025 X BRN X50-231	626	SCH
1.	DEAD BOLT (INDICATOR)	B660HD X 12-631 X 10-094 X BRN X 50-231	626	SCH
1	CYLINDER CORE	20-740.626.MK	626	SAN
1	CLOSER	4040XP.SCUSH.689.TBSRT	689	LCN
1	DOOR BOTTOM	FAS-SEAL DOOR SWEEP		CUST DB
1	THRESHOLD	566A X 36		ZER
1	DRIP CAP	142AA X 40		ZER
1	WALL STOP	WS406/407-CCV	US32D	IVE
1	GASKETING, CATEGORY G	188S-BK 17' PSA		ZER

Heading: 04

5 Marks:
B105, D100, E100, E103, E203

Each Opening To Have:

3	HINGE, 4 1/2, STD WT	5BB1 X 4.5 X 4.5	652	IVE
1	CYLINDRICAL DEAD LOCK	ND80HD X SPA X 12-247 X 10-025 X BRN X50-231	626	SCH
1	CYLINDER CORE	20-740.626.MK	626	SAN
1	CLOSER	4040XP.SCUSH.689.TBSRT	689	LCN
1	DOOR BOTTOM	FAS-SEAL DOOR SWEEP		CUST DB
1	THRESHOLD	566A X 36		ZER
1	DRIP CAP	142AA X 40		ZER
1	WALL STOP	WS406/407-CCV	US32D	IVE
1	GASKETING, CATEGORY G	188S-BK 17' PSA		ZER

Heading: 05

6 Marks:
E204, E205, E206, E207, E208, E209

Each Opening To Have:

3	HINGE, 4 1/2, STD WT	5BB1 X 4.5 X 4.5	652	IVE
1	CYLINDRICAL LOCK WITH THRU BOLTS ENTRANCE/OFFICE	ND50.T.RHO.626.ICX.50-231	626	SAN
1	CYLINDER CORE	20-740.626.MK	626	SAN
1	CLOSER	4040XP.SCUSH.689.TBSRT	689	LCN
1	WALL STOP	WS406/407-CCV	US32D	IVE
1	DOOR BOTTOM	FAS-SEAL DOOR SWEEP		CUST DB
1	THRESHOLD	566A X 36		ZER
1	DRIP CAP	142AA X 40		ZER
1	GASKETING, CATEGORY G	188S-BK 20' PSA		ZER

Heading: 06

2 Marks:
E101, E201

Each Opening To Have:

2	CONTINUOUS HINGE	112HD X 83	US28	IVE
1	MULLION	KR4954 X 7-6	SP28	VON
1	RIM EXIT DEVICE NIGHT LATCH	99NL-OP X 110MD-NL X 299 X 3-0	US26D	VON
1	RIM EXIT DEVICE	99EO X 299 X 3-0 X	US26D	VON
1	RIM CYLINDER	20-079.626	626	SAN
1	MORTISE CYLINDER	20-059.626.112	626	SAN
2	CYLINDER CORE	20-740.626.MK	626	SAN

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2	PULL	8190HD-0	US32D	IVE
2	CLOSER	4040XP.SCUSH X TBSRT X4040XP-18PA X 4040XP-30 X 4040XP-61	AL	LCN
1	THRESHOLD	566A X72	MIL	ZER

CLOSER SHOE SUPORT, DROP PLATE AND SPACER AS REQUIRED. SEALS BY STOREFRONT PROVIDER.

END OF SECTION 08 70 00

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SECTION 08 80 00 – GLAZING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Requirements including but not limited to:
   1. Float glass.
   2. Tempered glass.
   3. Insulated glass.
   4. Glazing sealants.
   5. Accessories necessary for a complete installation.

1.2 DEFINITIONS

A. Glass Thickness: Indicated by thickness designations in millimeters according to ASTM C 1036.

B. Interspace: Space between lites of an insulating glass unit.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design glass panels including comprehensive engineering analysis by a qualified professional engineer lawfully licensed in the State of Texas, using performance requirements and design criteria indicated.

B. Installed Glazing: Design glazing systems to withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

C. All Exterior glazing must be designed to meet requirements of Texas Windstorm Department of Insurance relative to both wind and impact resistance. Refer to 01 83 12 – Windstorm Rated Construction for design requirements. Exterior glazing and frames as a system, including all fasteners shall withstand a minimum of 45 PSF wind pressure.

D. Windborne Debris Impact Resistance: Exterior glazing shall comply with protection testing requirements in ASTM E 1996 for Wind Zone 4 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.
   1. Small Missile Test: For glazing located more than 30 feet (9.1 m) above grade.

E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
   1. For monolithic glass lites, properties are based on units with lites 6 mm thick.
   2. For insulating glass units, properties are based on units of thickness indicated for overall unit and for each lite.

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3. U-Factors: Center of glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
4. Solar Heat Gain Coefficient and Visible Transmittance: Center of glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

1.5 SUBMITTALS

A. Product Data: Technical data for each type of product including recommended installation and cleaning procedures.

B. Glass Samples: For each type of glass required. Prepare samples from same material to be used for Work.

C. Glazing Schedule: List glass types and thickness for each size opening and location. Use same designations indicated on Drawings.

D. Delegated Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Product Certificates: Submit glass product certificates required by Code.
   1. Glass Manufacturer Certificate: The glass manufacturer shall submit a letter certifying it has reviewed the glazing details proposed for the project, including the use of gaskets and sealants, and that each product furnished is recommended for the application shown and compliance with the Code.

F. Thermal Stress and Wind Load Analyses: Submit the following from the glass manufacturer:
   1. Thermal stress analysis for each exterior glass unit type, each building elevation. The analysis shall clearly indicate the expected service temperature ranges and the effects of partial and full shading on the glass.
      a. Attach to the thermal stress analysis a statement from the glass manufacturer that based upon this analysis that the resulting thermal stresses will not reduce the specified statistical probability of breakage.
   2. Wind load analysis for each glass unit type, each building elevation. The analysis shall indicate the statistical probability of breakage at the design wind pressure does not exceed the specified statistical probability of breakage.

G. Product Test Reports: Submit test reports for insulating glass and glazing sealants, for tests performed by a qualified testing agency.
   1. Glazing Sealants: Provide test reports based on testing current sealant formulations within previous 36-month period.
   2. Glazing Sealants: Preconstruction adhesion and compatibility test report.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Building Code: Comply with applicable requirements of the IBC for glazing.
   2. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

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a. As a minimum provide Category II materials complying with testing requirements in 16 CFR 1201 (Consumer Product Safety Commission Safety Standard for Architectural Glazing Materials, published in the Code of Federal Regulations) and ANSI Z97.1.
b. Permanently mark safety glass with certification label of Safety Glazing Certification Council.

3. Insulating Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
4. Glazing Publications: Comply with published recommendations of glass product organizations.
   a. GANA: Glazing Manual.
   b. IGMA: SIGMA TM-3000 Vertical Glazing Guidelines.
   c. GANA: Laminated Glazing Reference Manual.
   d. AAMA: AAMA GDSG-1 Glass Design for Sloped Glazing.
   e. AAMA: TIR A7 Sloped Glazing Guidelines.
   f. IGMA for Sloped Glazing: IGMA TB-3001 Guidelines for Sloped Glazing.
   g. IGMA for Insulating Glass: SIGMA TM-3000 North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use.
5. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
   a. Minimum Glass Thickness for Exterior Lites: 1/4 inch (6 mm).
   b. Thickness of Tinted Glass: Provide same thickness for each tint color indicated.
6. Strength: Where annealed float glass is indicated, provide annealed float glass, heat strengthened float glass, or fully tempered float glass necessary to comply with performance requirements.
   a. Where heat strengthened float glass is indicated, provide heat strengthened float glass or fully tempered float glass necessary to comply with performance requirements.
   b. Where fully tempered float glass is indicated, provide fully tempered float glass.

B. Manufacturer Qualifications for Insulating Glass Units with Sputter Coated, Low E Coatings: Insulating glass manufacturer who is approved and certified by coated glass manufacturer.

C. Installer Qualifications, Glazer: Experience entity having minimum 5 years documented experience and who employs glass installers certified under the National Glass Association's Certified Glass Installer Program.

D. Installer Qualifications, Decorative Film: Experience entity having minimum 5 years documented experience in the installation of glass films.

E. Source Limitations for Glass and Glass Accessories: Obtain each type of glass and glass accessories from a single source.

F. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

G. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

H. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

I. Install glazing in mockups specified in Section 08 41 13 and Section 08 51 00 to match glazing

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systems required for Project, including glazing methods.
1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

J. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass framing member for adhesion to and compatibility with elastomeric glazing sealants.
1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

K. Preinstallation Conference: Conduct conference at site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Delivery: Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by manufacturer.

D. Exercise exceptional care to prevent edge damage to glass, and damage/deterioration to coating on glass.

E. Comply with insulating glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 degrees F (4.4 degrees C).

B. Field Measurements: Verify actual dimensions of openings and construction contiguous with decorative glass by field measurements before fabrication.

1.9 COORDINATION

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A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.10 WARRANTY

A. Written warranty, executed by glass manufacturer agreeing to repair or replace glass units that fail in materials and workmanship or deteriorate within warranty period. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to decorative glass manufacturer's published instructions.
   1. Warranty Period: Five (5) years from date of Substantial Completion.

B. Coated Glass Products: Written warranty signed by manufacturer in which glass manufacturer agrees to replace coated glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
   1. Warranty Period: Ten (10) years from date of Substantial Completion.

C. Insulating Glass: Written warranty signed by manufacturer in which manufacturer agrees to replace insulating glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
   1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Glass:
      a. Vitro Architectural Glass.
      b. Guardian Industries Corp.
      c. Oldcastle Building Envelope.
      d. Pilkington North America.
      e. Viracon, Inc.

B. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

C. Ultraclear Float Glass: ASTM C 1036, Type I, Class I (clear), Quality-Q3.

D. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.

E. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
   1. Fabrication Process: By horizontal (roller hearth) process with roll wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

F. Heat Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A

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(uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller hearth) process with roll wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

G. Pyrolytic Coated, Low Maintenance Glass: Clear float glass with a coating on first surface having both photocatalytic and hydrophilic properties that act to loosen dirt and to cause water to sheet evenly over the glass instead of beading.

H. Ceramic Coated Vision Glass: ASTM C 1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in GANA Engineering Standards Manual.

I. Reflective Coated Vision Glass: ASTM C 1376.

K. Adhered Backing: Adhered scrim backing to ceramic coated surface; provide backed units identical to materials which, while possibly developing cracks and fissures, show no shear nor develop any openings large enough for the unobstructed penetration of 3 inch diameter sphere when tested by approved independent testing laboratory:
1. Mount test specimens consisting of 3 glass assemblies, 34" x 76" (plus zero or minus 3/16 inch), for testing as specified in ANSI Z-97.1.
2. Expose specimens to 100 cycles of the following conditions:
   a. 1 hour at 0 degrees F, ambient humidity.
   b. 3 hours increase from 0 degrees F to 140 degrees F, 95 to 100 percent relative humidity.
   c. 1 hour at 140 degrees F, 95 to 100 percent relative humidity.
   d. 3 hours decrease from 140 degrees F to 0 degrees F, ambient humidity.
3. Break glass by springloaded prick punch at midpoint of either vertical edge.
4. After breaking glass, subject it to pressure of 4 lbf per sq. ft. for 5 minutes to simulate wind load.
5. Inorganic Opacifier: Provide polyethylene opacifier where no insulation and other backing material is applied directly to spandrel glass. Use polyester where direct attachment does occur.
6. Fallout Resistance: Provide spandrel units identical to those passing fallout resistance test for spandrel glass specified in ASTM C 1048.

2.3 EXTERIOR GLASS

A. Provide all glass and glazing with the manufacturer’s label intact. Do not remove labels until glass and glazing has been installed and inspected.

B. Insulated glass shall be 1 5/16" thick impact resistant insulated glass with Solar Heat Gain Coefficient (SHGC) of 0.17, and a U-Value of 0.29.
Unit Construction:
Solarcool (2) + Solargray 1/4 inch tinted +1/2 inch (13mm) air space + Solarban 60 (3)1/4” clear /0.075” PVB/ 1/4” clear float Glass. Refer to the drawings for material schedule and locations.

2.4 INTERIOR GLASS

A. Interior insulated glass shall be 1" thick tempered insulated glass, Solarban 60 (3) Clear +

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Solarcool (2) + Solargray. Refer to the drawings for material schedule and locations.

B. Non-framed mirrors shall be 1/4" thick commercial quality polished plate glass with silver backing. Refer to toilet accessories schedule for quantity and locations.

2.4 GLAZING ACCESSORIES

A. Compatibility: Provide glazing sealants compatible with one another and with other materials in contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of service and application, demonstrated by sealant manufacturer based on testing and field experience.

B. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

C. Colors of Exposed Glazing Sealants: Selected by Architect.

D. Glazing Sealant: Neutral curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Dow Corning Corporation.
      b. GE Construction Sealants; Momentive Performance Materials Inc.
      c. May National Associates, Inc.; a subsidiary of Sika Corporation.
      d. Pecora Corporation.
      e. Sika Corporation.

E. Glazing Sealant: Neutral curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. BASF Corporation; Construction Systems.
      b. Dow Corning Corporation.
      c. GE Construction Sealants; Momentive Performance Materials Inc.
      d. May National Associates, Inc.; a subsidiary of Sika Corporation.
      e. Pecora Corporation.
      f. Polymeric Systems, Inc.
      g. Sika Corporation.

F. Glazing Sealant: Neutral curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Bostik, Inc.
      b. Dow Corning Corporation.
      c. GE Construction Sealants; Momentive Performance Materials Inc.
      d. May National Associates, Inc.; a subsidiary of Sika Corporation.
      e. Polymeric Systems, Inc.
      f. Schnee-Morehead, Inc., an ITW company.
      g. Sika Corporation.

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G. Glazing Sealant: Acid curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. BASF Corporation; Construction Systems.
      b. Bostik, Inc.
      c. Dow Corning Corporation.
      d. GE Construction Sealants; Momentive Performance Materials Inc.
      e. May National Associates, Inc.; a subsidiary of Sika Corporation.
      f. Pecora Corporation.
      g. Polymeric Systems, Inc.
      h. Schnee-Morehead, Inc., an ITW company.
      i. Sika Corporation.

H. Back Bedding Mastic Glazing Tapes: Preformed, butyl based, 100 percent solids elastomeric tape; non-staining and nonmigrating in contact with nonporous surfaces; with or without spacer rod recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
   1. AAMA 804.3 tape, where indicated.
   2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

I. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
   1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
   2 AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

J. Miscellaneous Glazing Accessories: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with proven record of compatibility with surfaces contacted in installation.
   1. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
   2. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
   3. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
   4. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
   5. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.
   6. Perimeter Insulation for Fire Resistive Glazing: Product approved by testing agency listed and labeled fire resistant glazing product with which it is used for application and fire protection rating indicated.

2.5 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product

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manufacturer and referenced glazing publications, to comply with system performance requirements.
1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
   a. Temperature Change: 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.
2. Edge and Surface Conditions: Comply with the recommendations of AAMA Structural Properties of Glass for clean cut edges, except comply with manufacturer's recommendations.
3. Exposed Glass Edges and Surface Condition: Finish edges flat with an arrissed edge profile (small bevel of uniform width not exceeding 1.5 mm at an angle of approximately 45 degrees to the surface of the glass) with polished (surface is reflective in appearance similar to the major surface of the glass) surface.

B. Cutting: Wheel cut or sawed edges and seamed at manufacturer's option. For site cut glass, provide glass 2 inches (50.8 mm) larger than required in both dimensions to facilitate cutting of clean-cut edges without the necessity of seaming or nipping. Do not cut, seam, nip or abrade heat treated glass.

C. Butt Glazing: Clean cut or flat grind vertical edges of butt glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
Edges: Grind smooth and polish exposed glass edges and corners.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
1. Manufacturing and installation tolerances, including size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Clean glazing channels and framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
1. Comply with manufacturer instructions for wiping of surfaces immediately before application of primers.
2. Wipe metal surfaces with IPA (isopropyl alcohol) unless otherwise required by compatibility and adhesion testing results.

B. Inspect each piece of glass immediately before installation. Do not install pieces improperly sized or with damaged edges, scratches, abrasion, or evidence damage. Remove labels from glass immediately after installation.

C. Examine glazing units to locate exterior and interior surfaces. Label or mark units so exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the

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completed Work.

D. Seal vent (breather or capillary) tubes in insulating glass units in accordance with insulating glass manufacturer written recommendations.

E. Glass Film Preparation:
   1. Remove particulate matter on the glass surface using a scraping blade.
   2. Place an absorbent towel on windowsill or sash to absorb moisture generated by the film application.

3.3 GLAZING

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8 inch (3 mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior, or interior as specified.

J. Where wedge shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
   1. Square cut wedge shaped gaskets at corners and install gaskets as recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with

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sealant recommended by gasket manufacturer.

K. Tape Glazing: Position tapes on fixed stops so that, when compressed by glass, the exposed edges are flush with or protrude slightly above sightline of stops.
   1. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make tapes fit opening.
   2. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
   3. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
   4. Do not remove release paper from tape until right before each glazing unit is installed.
   5. Apply heel bead of elastomeric sealant.
   6. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
   7. Apply cap bead of elastomeric sealant over exposed edge of tape.

L. Gasket Glazing (Dry): Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
   1. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
   2. Installation with Drive in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
   3. Installation with Pressure Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
   4. Install gaskets to protrude past face of glazing stops.

M. Sealant Glazing (Wet): Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
   1. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
   2. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

N. Structurally Glazed Units: Set full height continuous structural gaskets/spacers to vertical mullions. Set glass units with void between edge of units and head/sill channel, but with units fully within head/sill rebate so as to provide a proper bite.
   1. Align glass unit edges over vertical mullion continuous structural gasket/spacers and secure with manufacturers recommended temporary cleats.
   2. Structurally seal glass unit to vertical mullions with specified one part structural silicone sealant. Tool structural silicone flush in alignment to mullion face and perpendicular to face of interior glass light; remove excess structural silicone from glass and metal substrates.

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3. After full cure of structural silicone sealant remove temporary cleats. Immediately seal holes left in the vertical mullions caused by temporary cleats.
4. Insert and shape weatherseal joint backer rods, or gaskets, into vertical void between glass units and at a proper depth to receive silicone weatherseal sealant.
5. Place silicone weatherseal sealant into void and tool flush with adjacent exterior glass light faces; remove excess sealant from glass and metal substrates.

O. Erection Tolerances:
1. Maximum Deviation from Vertical: 1/8 inch in any story and 1/4 inch in any 45-foot run.
2. Maximum Deviation from Horizontal: 1/8 inch in any 30-foot run.
3. Maximum Deviation from True Alignment: 1/32 inch for any two (2) abutting units. Allow no edge projections.
4. Maximum Joint Gap: 1/32 inch.

3.4 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
1. If contaminating substances come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

PART 4 – SCHEDULE

4.1 GLAZING SCHEDULE

A. GL-1: Interior 1 inch (25mm) sealed insulated unit

B. GL-2: Exterior 1-5/16" inch sealed impact resistant insulated unit.

END OF SECTION 08 80 00

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SECTION 09 21 16 – GYPSUM BOARD ASSEMBLIES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. Section Includes:
   1. Glass Mat Gypsum Board Sheating.
   2. Gypsum Board, metal framing and joint treatment.
   3. Tile Backer Board.
   4. Metal channel ceiling framing.
   5. Texture finish requirements.

REFERENCE SPECIFICATIONS

A. The Standard Specifications of the Gypsum Drywall Contractors International (GDCI) and the requirements of ASA No. A97 1 are hereby made part of these specifications. Requirements stated below which may differ from those in the reference specifications shall take precedence.
B. Component Design: Compute structural properties of studs and joists in accordance with "Specification for Design of Cold-Formed Steel Structural Members" latest edition, as published by the American Iron & Steel Institute (AISI).
C. Codes and Standards:
   1. "Structural Welding Code - Sheet Steel", AWS D1.3 as published by the American Welding Society (AWS).
   2. "Recommended Practices for Resistance Welding Coated Low Carbon Steels", AWS C1.3, as published by the American Welding Society.
   3. 2021 International Building Codes.
   4. Texas Department of Insurance Windstorm Certification Program.

GRADES & FINISH OF STEEL

A. For 16-gage and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 psi and conform to ASTM A 653 and/or A 1011.
B. For l8-gage and lighter units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 33,000 psi and conform to ASTM A 653 and/or A 1011.
C. Provide galvanized finish to all metal framing components complying with ASTM A 653 for minimum G40 coating or having a coating that provides equivalent corrosion resistance. A40 galvannealed products are not acceptable.

SUBMITTALS

A. Product Data: Submit manufacturer's product information and installation instructions for each item of coldformed framing and accessories.

B. Shop Drawings: Submit shop drawings for all coldform metal framing used to support exterior cladding and used as loadbearing support for any floor or roof areas. Shop drawings shall indicate placing of all framing members showing type, size, gage, number, location and spacing. They shall also indicate supplemental strapping, bracing, splices, bridging, accessories and details required for proper installation. Shop drawings must indicate type of fastening system used along with size and number of fasteners.
   1. Welded connections shall show size ans length of welds for all components.

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2. Screwed connections shall show type, size, and number of screws for all connections. Submit manufacturer's data giving strength values for screws used.

Shop drawings submitted must be prepared under the supervision of and selaed by a registered professional engineer in the state where the project is located. The Engineer of record will not be responsible for coldformed metal framing erected without approved shop drawings.

C. Calculations: Submit calculations for all coldformed metal framing used to support exterior cladding and used as loadbearing support for any floor or roof areas. Calculations shall indicated sizeing of members supporting the loads as indicated on the drawings and design of connections indicating method of connetion and,

1. size and length of all welds for welded connections.
2. type, size, number and capacity of all screwed connections.

Calculations must be prepared and sealed by a registered engineer in the state where the project is located.

TYPES

A. Cee "C" Shape Loadbearing and Exterior Cladding Studs:
   1. See Architectural and Structural Drawings .

Subject to compliance with requirements, manufacturers offering Cee "C" shaped, loadbearing steel studs which may be incorporated in the work include, but are not limited to the following:

1. ClarkDietrich Building Systems
2. Bostwick Steel Framing Co.
3. U.S. Gypsum.
4. Wheeling Corrugating Co.

MATERIALS

A. Gypsum wallboard and ceiling products:
   1. Exterior Glass Mat sheathing shall be
      a. 1/2” thick, 4’-0” x 8’-0” DensGlass Gold Exterior Guard panels as manufactured by G-P Gypsum or equal.
      b. To conform to TDI Windstorm requirements.
   2. Interior wall and ceiling board shall be
      a. 5/8” thick, Gold Bond Type XP Hi-Impact, 4’-0” x 8’-0” or 12’-0” panels as manufacted by National Gypsum or equal
   3. Interior walls to receive Tile for both wet and non-wet areas shall be
      a. 5/8” thick, fire rated Type X glass mat faced gypsum Tile Backer, National Gypsum eXP Tile Backer or equal.
   4. Interior walls in wet areas to receive Tile: Cementitious Fiber-Mat Reinforced Panels, 1/2" thick x 32 or 48 inches wide, maximum practical length, square edge
      a. United State Gypsum Company – Durock or equal.
   5. Press Box Walls to receive acoustically enhanced 5/8” thick Type X, impact-resistant gypsum board shall be
      a. National Gypsum – Soundbreak XP or equal.

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6. Interior shaft wall shall be 1" Gold Bond, Fire-Shield Shaftliner XP, 2'-0"x8'-0" or 12'-0" panels with double-beveled edges as manufactured by National Gypsum, or equal.

B. Metal stud and joist framing components:
1. Metal studs or other cold rolled members in all exterior walls shall be sizes as indicated on the drawings and be galvanized sections as specified or scheduled on the structural drawings as manufactured by ClarkDietrich Building Systems, or equal. If not specifically noted or scheduled on structural drawings to the contrary all exterior studs shall be 16 gauge.
2. Metal studs for all suspended furrings at ceilings shall be sizes as indicated on the drawings and be 16 gauge, galvanized members with 2” flanges as manufactured by Unimast Inc., or equal.
3. Metal studs for full height shaft walls, shall be 4" C-H or CT studs, 20 gauge, galvanized members as manufactured by ClarkDietrich Building Systems., or equal.
4. Metal studs in interior walls running full height, and framing walls with ceramic tile finish shall be sizes as indicated on the drawings and be 20 gauge members with 1 3/8" flanges as manufactured by ClarkDietrich Building Systems., or equal.
5. All other metal studs in interior walls shall be sizes as indicated on the drawings and be 25 gauge members with 1 1/4" flanges as manufactured by ClarkDietrich Building Systems, or equal.
6. Header and beam joists and ceiling framing shall be as noted specifically on the drawings or 6”, 16 gauge, galvanized members with widest flanges that will fit in width of wall when set side by side as manufactured by ClarkDietrich Building Systems., or equal.
7. Track shall be galvanized deep leg sections in same width and gauge as studs or joists as manufactured by ClarkDietrich Building Systems, or equal.
8. Horizontal wall bridging shall be 1-1/2”, 16 gauge, galvanized CRC (cold-rolled channel) sections as manufactured by ClarkDietrich Building Systems., or equal.
9. Screws shall be type “S” self-drilling drywall screws.
10. All other fasteners not specifically noted on the plans shall be weather and corrosion resistant suitable for substrates to which metal members are being attached.

C. Suspended drywall ceiling components:
1. DGL-26 1 1/2” face main tees, heavy duty classification 1 1/2” high x 144” long, integral reversible splice with knurled face and DGLW-424 cross tee sections 1 1/2” high x 48” long as manufactured by USG or equal.
2. DGWM-24 wall molding 1” x 1 1/2” x 144” long, as manufactured by USG or equal.
3. Hanger wire shall be minimum 12 gauge annealed steel, galvanized.
4. Screws shall be type “S” self-drilling drywall screws.

D. Metal hat section ceiling stripping:
1. HW-3100, 22 gauge, 1 1/2” high galvanized hat sections (HS-1) as manufactured by MBCI.

E. Accessories:
1. Corner beads shall be “Dur-a-Bead” no. 103 with 1-1/4” x 1-1/4” flanges as manufactured by United States Gypsum Company, or equal.
2. Casing beads shall be “Sheetrock” series no. 200-A, “J” shaped, channels as manufactured by United States Gypsum Company, or equal.
3. Control joints shall be “Sheetrock”, zinc, no. 093 as manufactured byUnited States Gypsum Company, or equal.
4. Drywall revels shall be located at all visible areas where gypsum board meets concrete block and as detailed on drawings and manfucatured by Fry Reglet Corporation or equal.

F. Sealants:
1. Concealed acoustical sealants shall be rubber based, permanently flexible, non-skinning and non-hardening as manufactured by Tremco, Pecora, Presstite Division of Interchemical Corp., or equal.

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2. Exposed acoustical sealants shall be a synthetic resin, paintable compound as manufactured by Tremco, Pecora, Presstite Division of Interchemical Corp., or equal.

INSTALLATION

A. Steel wall framing:
   1. Install continuous runners (tracks) at partition heads, bases and wherever partition ends terminate against surfaces of other materials. Secure runners (tracks) to other materials with proper fasteners at 24” o.c. maximum.
   2. Install all studs at 16” o.c. maximum, with studs located no more than 2” from ends of all partition runs. Provide double studs (min. 20 gauge) at jambs of all door and window openings.
   3. Install a minimum of two horizontal runs of CRC (cold rolled channels) through studs as stiffeners in partitions not exceeding 10’-0” in height. Provide a minimum of three rows of stiffeners in partitions greater than 10’-0” in height.
   4. All studs and wallboard shall terminate a minimum of 12” above ceilings. Refer to plans to identify walls and framing which is full height from floor to bottom of structure above.
   5. Brace top of non-full height partitions at approximately 45 degrees using stud material to structure above at 4’-0” o.c. maximum and at jamb studs on each side of door frames. Brace full height walls similarly from a point just above the ceiling to the structure above.
   6. Fasten suspended ceiling furrings using stud material braced continuous horizontally between structural joists and beams. Do not screw suspended furrings to metal deck above.
   7. Install lateral and diagonal racking bracing as per manufacture’s recommendations and if noted on drawings.
   8. Fastening of all components shall be with self-drilling screws or welding. Screws shall be of sufficient size to insure the strength of the connection. Wire tying of components shall not be permitted. All welds shall be touched up with a zinc-rich paint.

B. Gypsum wall and ceiling board:
   1. Install wall board vertically with joints centered over studs. Stagger joints on opposite sides of wall. Attach to studs and floor and ceiling runners with 1” long drywall screws at maximum 8” o.c. along edges of boards and maximum 12” o.c. in the field of the boards. For installation of second layer, install same as described above staggering joints from first layer using 1-5/8” long drywall screws at maximum 8” o.c. along edges of boards and maximum 12” o.c. in the field of the boards. Wall board shall be installed as required for 1 Hr. fire rating.
   2. Install ceiling board with long dimension perpendicular to the direction of existing structure. Attach to existing structure same as wall board described above. Existing structure along long edges of panels should fall over solid blocking run between structural memebers. Ceiling board shall be installed as required for 1 Hr. fire rating.

C. Ceiling suspension systems:
   1. Install in accordance with manufacturer’s written instructions to assure system will support itself plus gypsum board, light fixtures, diffuses and other ceiling supported items with a maximum allowable deflection of 1/360 of span.
   2. Main tees shall be spaced a maximum of 48” on center and supported by hanger wires spaced a maximum 48” on center and as specified by UL Fire Resistance Directory attaching hanger wires directly to structure above. Cross tees shall be spaced per manufacture’s recommendations and as specified by UL Fire Resistance Directory.
   3. Provide additional hanger wires at all four corners of light fixtures, at the midspan of cross tees adjacent to light fixtures and at the cut end of cross tees longer than 23’ which abut the walls.

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4. Provide secondary supports (such as unistrut) to span beneath large ducts and suspended equipment to allow the maintaining of maximum hanger wire spacing specified above. Secondary supports must be hung from building structure above and not from ductwork or equipment. Submit design of secondary supports to maintain maximum allowable deflection of system (1/360 of span) for Architect's approval.
5. Adjust main runner and cross tee spaces as required to accommodate light fixtures, diffusers and other ceiling mounted items. Refer to reflected ceiling plans.

D. Accessories:
1. Install corner beads at all external corners. Corner beads must be screw attached, crimp-on attachment is not acceptable.
2. Install casing beads at all exposed wall or ceiling board edges and at all locations where wall or ceiling board abuts a different material.
3. Install control joints in drywall at no less than 50'-0" o.c., or as shown on plans. Control joints in fire-rated walls, ceilings or assemblies must be designed to maintain the integrity of the fire rating specified and design must be approved by the architect

E. Sealants:
1. Apply acoustical sealants in accordance with manufacturer's printed instructions at the following locations:
   a. Serpentine beads under floor track and at ceiling track when abutting other construction.
   b. Between all gypsum board edges and other materials and building elements.

F. Wood blocking:
1. Install miscellaneous wood blocking to support items requiring secure fastening with in drywall construction.
2. Refer to Section 06 10 00.

SCHEDULES – LEVEL OF FINISH

A. Finishes in accordance with GA-214 Level:
1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, on portions of walls above ceilings between the ceilings and the tops of wallls and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound rated assemblies.
2. Level 2: Embed tape and apply first coat of joint compound to tape, fasteners, and trim flanges where panels are stubtrate for tile or behind cabinetry.
3. Level 3: Embed tape and apply separate first and fill coats of joint compound to tape, fasteners, and trim flanges where panels are substrate for medium or heavey textures.
4. Level 4: Embed tape and apply separate first, fill and finish coats of joint compound to tape, fasteneres, and trim flanges where panels are substrate for light textures, flat paints or wall coverings.
5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coate of joint compound over entire surface where panels are over 10'-0" high and are substrate for gloss or semi-gloss paints. Walls or ceilings where severe lighting conditions occur (such as perpendicular to windows, storefronts or skylights). All public lobbies, vestibules and entrances, including ceilings.

6. Refer to Section 09 90 00 for specific paints specified. Refer to Material and Finish schedule for additional level of finish and/or gloss requirements.

END OF SECTION 09 21 16

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SECTION 09 30 00 – TILING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. Section Includes:
   1. Ceramic Wall Tile.
   2. Ceramic Floor Tile.
   3. Ceramic Wall Base.
   4. Grouted joints.
   5. Transition Strips and Accessories.

B. Related Requirements:
   1. Section 03 30 00 – Cast-in-Place Concrete.
   2. Section 04 20 00 – Unit Masonry Assemblies.
   3. Section 07 92 00 – Joint Sealants.
   4. Section 09 21 16 – Gypsum Board Assemblies:.

REFERENCES

A. American National Standards Institute:
   1. ANSI A108/A118/A136.1 - American National Specifications for the Installation of Ceramic Tile.
   2. ANSI A137.1 - American National Standards Specifications for Ceramic Tile.

B. Accessibility:
   1. TAS – 2012 Texas Accessibility Standards.
   2. 2012 ADA Standards of Accessible Design.

C. Codes:
   1. 2021 International Building Codes.
   2. City of Corpus Amendments and Ordinances.

QUALITY ASSURANCE

A. Conform to ANSI - American National Standard Specifications for the Installation of Ceramic Tile. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2014.

B. Conform to TCA (HB) - Handbook for Ceramic Tile Installation; Tile Council of North America, Inc.; 2021.

PERFORMANCE REQUIREMENTS

A. Dynamic Coefficient of Friction (DCOF) – by DCOF AcuTest, all floor tile shall have a minimum DCOF of 0.42, ANSI A137.1.

SUBMITTALS

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A. Submit actual material samples of all tile and grout products to Architect for approval prior to ordering and/or installing any material.

DELIVERY, STORAGE AND HANDLING

A. Protect materials from moisture, freezing or overheating in accordance with manufacturer's instructions.

B. Deliver materials in original unbroken containers bearing the name of manufacturer, brand and grades seals.

MANUFACTURERS

A. All tile materials shall be quality certified by the Tile Council of America, Inc. to equal or exceed standard grade requirements of AMSI Specification 137.1.1980, packed in sealed containers bearing the certification mark of the TCA.

B. Tile: Refer to Material and Finish Schedules on Drawings.

C. Manufacturers of other products listed or required shall be equal to those listed below:
   1. Texas Cement Products, Inc., Tex-Rite Custom Building Products.
   2. Laticrete International.
   3. Mapei Corporation.
   4. Schluter Systems.
   5. Custom Building Products.

D. Substitutions: Under provisions of Section 01 25 00.

MATERIALS & INSTALLATION

A. TILE FLOORING: Refer to drawings for color selection, sizes, patterns and locations. Install flooring in accordance with the Tile Council of America’s 2018 Installation Handbook, Specification F-122A-17, for thin set tile installation over a waterproofing membrane using latex Portland cement mortar.
   1. Install Laticrete 9235 Waterproofing Membrane over concrete sub-floor.
   2. Install floor tile on top of Waterproofing Membrane using Laticrete 254 Platinum Multipurpose thin-set mortar.

B. Waterproofing membrane shall be Laticrete 9235 liquid applied membrane or approved equal. Membrane must be installed in strict accordance with Manufacturer's written instructions for the particular application.

C. TILE BASE: Refer to drawings for color selection, sizes, patterns and locations. Install using same specification as for wall tile.

D. INTERIOR WALL TILES: Refer to drawings for color selection, sizes, patterns and locations.
   1. Install Laticrete 9235 Waterproofing Membrane over cementitious backer board.
   2. Install ceramic wall tile on top of Waterproofing Membrane using Laticrete 254 Platinum Multipurpose thin-set mortar.

E. INTERIOR LATEX MODIFIED GROUT: Cementitious type, sanded and unsanded, resistant to

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shrinkage, with latex additive admix; bacteria and mildew resistant. Meets ANSI A118.7
1. Grout joints: are to be thinnest joints per manufacturer's recommended range.
2. Manufacturer and product: Laticrete Grout or equal to all tile. Refer to drawings for Color selection.

F. Once grout has fully cured, install commercial silicone sealant over all grout, at interior walls and floors.

G. Install 3/8" (10mm) movement joints where required or recommended per manufacturer. Laticrete LATASIL and Backer Rod.

SELF LEVELING UNDERLAYMENT

A. Where Leveling Floor is Required: Level Quick by Custom Building Products. Use with polymer modified, latex primer.

TRANSITION STRIPS

A. Provide transition strips at wall and floor areas as follows:
1. Provide Schluter Systems RENO-RAMP aluminum transition strip at areas where floor tile meets LVT.
2. Provide Schluter Systems JOLLY aluminum edge trim at top and side edges of wall tile wainscot where tile meets gypsum board.
3. Provide Schluter Systems QUADEC aluminum edge trim at all outside corners of wall tile.
4. All transitions strip finishes shall be satin nickel anodized.

CLEANING & PROTECTION

A. Upon completion of grouting work thoroughly clean all grout film from tile surfaces. After grout has fully cured, apply sealer as specified above.

B. Protect floor tile by covering or controlling traffic until work by other trades is complete.

GUARANTEE

A. Furnish a written guarantee from the installer that all work performed under this section shall be free from defects in material and workmanship for a period of 1 year from the date of substantial completion of the project.

END OF SECTION 09 30 00

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SECTION 09 51 13 – ACOUSTICAL PANEL CEILINGS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

GENERAL

A. All suspended ceiling systems shall be warranted for one (1) year against becoming unserviceable or objectionable in appearance as a result of being defective or non-conforming. Without limiting the warranty scope, the work shall be warranted against:

1. Noticeable sagging of the tile or board.
2. Discoloration, darkening, mildewing of tile, board or exposed metal parts.
3. Rusting or corrosion of the suspension system.
4. Gaps in the tile or board caused by loose or improperly sized units.

SUBMITTALS

A. Furnish one unit of each type of ceiling tile or board along with samples of each type of suspension system.

PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unopened, protective packaging, with manufacturer's labels indicating brand name, pattern, size, thickness and fire rating, legible and intact.

B. Store materials in original protective packaging to prevent soiling, physical damage or wetting.

C. Store cartons open at each end to stabilize moisture content and temperature.

D. Do not begin installation until sufficient materials to complete a room are received.

ENVIRONMENTAL REQUIREMENTS

A. Complete installation of dampening materials before beginning Work.

B. Do not install acoustical ceilings until exterior openings have been closed and the roofs are watertight. Temperature and relative humidity in the installation areas shall have reached levels which comply with the acoustical material manufacturer's recommendations before beginning work.

C. Maintain temperature and relative humidity levels in the installation areas within the acoustical material manufacturer's recommended range during and after installation until acceptance by the Owner.

MATERIALS

A. Suspension system shall be non-fire rated, Prelude XL 15/16”, heavy duty, Exposed Tee System, 24” x 24”, and 48” x 48” in white finish as manufactured by Armstrong or equal.

B. Ceiling panels (unless listed below) shall be 24” x 24” x 5/8”, 465 High Durability – School Zone Fine Fissured, square edged, HumiGuard Plus, Anti-Mold/Mildew (BioBlock paint onface and back

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of HumiGuard panels to inhibit or retard growth of mold/mildew on painted surfaces), Impact-Resistant, white finish as manufactured by Armstrong,or equal.

C. Provide hold-down clips at all ceiling panels.

D. Refer to drawings for various drywall / acoustical ceiling reveals and edge treatments as manufactured by Fry Reglet Corporation.

ABOVE CEILING INSPECTION

A. Examine surfaces scheduled to receive suspended units for irregularities and dampness that would affect quality and execution of Work. Deficiencies must be corrected before contractor installs ceiling.

B. Mark access provisions at locations where indicated by the Mechanical Subcontractor before beginning installation.

C. As a minimum, the following shall be in place before observation is scheduled:
   1. Minimum of 80% of light fixtures installed and functioning.
   2. Piped systems installed and insulation completed; leak and pressure tests performed and acceptable.
   3. Pipe painting and indentification complete.
   4. Rigid and flexible ducts completed and insulated.
   5. Air devices installed and connected.
   6. Control air tubing installed.

WORKMANSHIP

A. Coordinate and schedule the work with adjoining work provided under other sections of the specifications. Do not close ceilings until all work above ceilings is complete.

B. Examine the job conditions affecting acoustical installation and report to the Contractor any deficiencies that will prevent proper installation of acoustical work. Do not start installation until such deficiencies have been corrected.

C. Installation shall conform to the drawings, the applicable specifications of the Acoustical Materials Association, the manufacturer’s written instructions and the requirements herein.

D. The suspension systems shall support the ceiling assemblies shown on the drawings, including lighting fixtures, diffusers, grilles and similar items in the assemblies, with a maximum allowable deflection of 1/360 of span.

E. Provide secondary supports (such as unistrut) to span beneath large ducts and suspended equipment to allow the maintaining of maximum hanger wire spacing as recommended by the manufacturer. Secondary supports must be hung from the structure above and not from ductwork or equipment. Submit design of secondary supports to maintain maximum allowable deflection of system (1/360 of span) for Architect’s approval.

F. Layout the work in conformance with the reflected ceiling plan. Center patterns in spaces and conform to building modules as indicated. Layout shall provide greatest possible width of perimeter units, with widths being equal at opposite sides of the spaces. Uniform patterns for

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ceiling units, lighting fixtures, diffusers and grilles shall be provided through cooperation with other installing trades.

G. Completed ceilings shall be level, true to plane, pattern and module and square with the walls. Joints in tile, board and exposed suspension members shall be parallel and true. Ceiling work shall fit closely to adjoining items and construction, and be free from damaged tile and trim.

H. Before final inspection and acceptance of the work, clean soil marks from ceilings,replace damaged units, touch-up abrasions on exposed metal with matching paint, and make any necessary adjustments to the systems. Leave the work clean, true to design and free from defects.

CLEANING

A. Clean soiled or discolored unit surfaces after installation.

B. Touch up scratches, abrasions, voids and other defects in painted surfaces.

C. Remove and replace damaged, or improperly installed units.

D. Clean exposed surfaces of grid members and panels, including trim and edge moldings. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

END OF SECTION 09 51 13

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SECTION 09 56 01 – RESILIENT STAIR TREADS AND RISERS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. Section Includes:
   1. Resilient Rubber Stair Tread with Riser.

SUBMITTALS

A. Submit various manufacturer's samples for Architect's approval and selection.

PROJECT CONDITIONS

A. Install resilient products after other finishing operations, including painting, have been completed.

B. Maintain ambient temperatures within range recommended by Johnsonite, but not less than 65 deg F (18 deg C) or more than 85 deg F (29 deg C) in spaces to receive resilient products during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

C. Maintain the ambient relative humidity between 40% and 60% during installation.

D. Until Substantial Completion, maintain ambient temperatures within range recommended by Johnsonite, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

MANUFACTURER

A. Johnsonite, Inc. 16910 Munn Road, Chagrin Falls, Ohio 44023. (800) 899-8916.

MATERIALS

A. Resilient Rubber Stair Tread:
   JOHNSONITE RUBBER INTEGRATED STAIR TREAD WITH RISER – Rubber Integrated Stair Tread and Riser with the following physical characteristics:
   a. Manufactured from a homogeneous composition of 100% synthetic rubber.
   b. Complies with requirements for ASTM F 2169 Standard Specification for Resilient Stair Treads, Type TS, Class 1 and 2, Group 1 and 2.
   c. Hardness: ASTM D 2240 – Not less than 85 Shore A.
   d. Abrasion Resistance: ASTM D 3389 – less than 1 gram weight loss.
   e. ASTM D 2047, Standard Test Method for Static Coefficient of Friction of Polish- Coated Flooring of 0.6 or greater.
   f. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm2 or greater, Class I.
   g. Integrated tread and riser.
   h. Visually Impaired treads meet ADA and are California Title 24 Ac-cessibility requirements.
   i. Visually Impaired treads will have 2" wide co-extruded contrasting color in-sert or 2" wide contrasting color grit tape insert.

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1. Solid Color Rubber Integrated Stair Tread and Riser
   Diamond surface, solid color integrated stair tread and riser, 2" height hinged Square Nose, tapering .210" to .113", 20" overall width including 13" tread depth with 7" integrated riser. Color to be TB1 – Peppercorn to match “RB1”.

INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based formulation manufactured and warranted by a reputable manufacturer.

B. Adhesives: as recommended by Johnsonite to meet site conditions.

C. Stair Tread and Nose Filler: Johnsonite #930 Two-Part Epoxy Caulking Compound to fill nosing substrates that do not conform to tread contours.

EXAMINATION & PREPARATION

A. Proceed only when conditions are suitable for satisfactory performance of the work. Examination shall include the following items:
   1. Smoothness:
      a. Correct any irregularities that will cause a visible fault in the finished job.
      b. Install liquid latex underlayment to level out irregularities. Sand smooth after liquid has dried.
   2. Cleanliness:
      a. Accept subfloor surface only in perfectly clean condition with all foreign materials removed.
      b. Anything that can telegraph through rubber and cause a fault must be removed.

B. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
   3. Mechanically remove contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.
   4. Prepare Substrates according to ASTM F 710 including the following:
      a. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
         1) Perform anhydrous calcium chloride test, ASTM F 1869. Results must not exceed 5 lbs. Moisture Vapor Emission Rate per 1,000 sq. ft. in 24 hours.
            – or –
         2) Perform relative humidity test using in situ probes, ASTM F 2170. Must not exceed 80%.
      b. A pH test for alkalinity must be conducted. Results should range between 7 and 9. If the test results are not within the acceptable range of 7 to 9, the installation must not proceed until the problem has been corrected.
      c. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.

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B. Verify with adhesive manufacturer the compatibility of curing compound and adhesive. Conduct adhesive tests in areas which appear to have an excessive build-up of curing compound.

C. Notify Architect to inspect preparation work prior to commencement of flooring installation.

INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Tread and Nosing:
   1. Use Johnsonite #930 Epoxy Caulking Compound to strengthen nosing and fill irregularities in substrates to conform to tread nosing.
   2. Tightly adhere to substrates throughout length of each piece.
   3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 09 56 01

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SECTION 09 65 13 – RESILIENT WALL BASE

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Resilient Wall Base and accessories.
   2. Substrate preparation.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size samples of each resilient product color, texture, and pattern required.

D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by Johnsonite, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

1.5 PROJECT CONDITIONS

A. Install resilient products after other finishing operations, including painting, have been completed.

B. Maintain ambient temperatures within range recommended by Manufacturer, but not less than 65 deg F (18 deg C) or more than 85 deg F (29 deg C) in spaces to receive resilient products during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

C. Maintain the ambient relative humidity between 40% and 60% during installation.

D. Until Substantial Completion, maintain ambient temperatures within range recommended by Manufacturer, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

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PART 2 - PRODUCTS

2.1 RESILIENT WALL BASE

A. Manufacturer:
(Basis of Design) Johnsonite, Tarkett North America (800) 899-8916
Resilient Tratitional Rubber Duracove Wall Base

1. (RB1) 4” Cove profile – Refer to Material Schedule for color selection. Provide outside corners where required.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based formulation manufactured and warranted by a reputable manufacturer.

B. Adhesives: as recommended by Tarkett to meet site conditions
1. Tarkett 960 Cove Base Adhesive (Porous applications)
2. Tarkett 946 Premium Contact Bond Adhesive (Non-porous applications)

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to Johnsonite's written instructions to ensure adhesion of resilient wall base.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with Tarkett’s written instructions for installing resilient base.

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B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere Millwork resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. Preformed corners: Install preformed corners before installing straight pieces.

G. Millwork profiles – job-formed corners:
   1. Outside corners: Use straight pieces of maximum lengths possible and miter corners to fit.
   2. Inside corners: Butt one piece to corner then scribe next piece to fit.

3.4 CLEANING AND PROTECTION

A. Comply with Tarkett's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 09 65 13

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SECTION 09 65 16 – COMMERCIAL VINYL FLOORING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.1 REFERENCES

A. ASTM International (ASTM):
   1. ASTM F 1700 - Standard Specification for Solid Vinyl Floor Tile.

1.2 SUBMITTALS

A. Product Data: Provide detailed data on each product to be used including but not limited to the following information as applicable:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance recommendations.

B. Verification Samples: For each finish product specified, two sets of each type, colors and finish of resilient flooring and accessory required, indicating color and pattern of actual product, including variations, as proof of application compliance.

C. Closeout Submittals: Submit three copies of the following:
   1. Maintenance and operation data includes - methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
   2. Documentation of warranty specified herein.

D. Flame Spread Certification: Submit manufacturer's certification that resilient flooring furnished for areas indicated to comply with required flame spread rating has been tested and meets or exceeds indicated or required standard.

1.3 QUALITY ASSURANCE

A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until workmanship, color, sheen and finished appearance are approved by Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Flooring material and adhesive shall be acclimated to the installation area for a minimum of 48 hours prior to installation.

C. Store cartons of tile products flat and squarely on top of one another, not on edge.

1.5 PROJECT CONDITIONS

A. Environmental Requirements/Conditions: In accordance with manufacturer's

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recommendations. Areas to receive flooring shall be clean, fully enclosed, weather tight with the permanent HVAC set at a uniform temperature of at least 65 degrees F (18 degrees C) and less than 85 degrees (30 degrees C) 48 hours prior to and during and for not less than 48 hours after installation. The flooring material shall be conditioned in the same manner prior to installation.

B. Close spaces to traffic during resilient flooring installation and for a period of time after installation as recommended in writing by the manufacturer.

C. Install resilient flooring materials and accessories after other finishing operations, including painting, have been completed.

D. Where demountable partitions and other items are indicated for installation on top of sheet resilient flooring material, install flooring material before these items are to be installed.

E. Concrete substrates should not exceed 82 percent RH and/or 6 lbs. X 24 hrs. X 1000 sf. moisture vapor emissions rate tested in accordance to ASTM F 2170 and ASTM F 1869.

1.6 WARRANTY

A. Warranty Period: Manufacturer's standard warranty against manufacturing defects and wearing for flooring and as follows:
   1. Patcraft:
      a. Lifetime Limited Warranty.

1.7 EXTRA MATERIALS

A. Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 closeout submittals requirements.
   1. Quantity: Furnish quantity of flooring units equal to 2 percent of amount installed. Comply with Owner's requirements for delivery, storage and protection of extra materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: (Basis of Design) Mohawk Group 800.554.6637 – Reference Material Schedule for Product Selections.

B. Substitutions: Permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00 Substitution Procedures.

2.2 GLUE DOWN LVT

A. Glue Down LVT:
   1. Style: Refer to Material Schedule
   2. Style Number: Refer to Material Schedule
   3. Color: Refer to Material Schedule
   4. Product Type: Glue Down LVT

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5. Overall Thickness: 5 mm
6. Wear Layer Thickness: 20 mil (0.5 mm).
7. Finish: M-Force Ultra Enhanced Urethane.
8. Size: 18” W x 36” L
9. Construction: Commercial Grade Luxury Vinyl Tile
10. Installation: Glue Down
11. Classification: ASTM F1700-Class III, Type A-Smooth, Type B-Embossed

2.3 ACCESSORIES

A. Adhesive: Manufacturer's recommended adhesive.

B. Portland based cementitious base leveler. Gypsum based not acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect floor to be installed immediately upon arriving at job site; perform a moisture test.

B. Do not begin installation until substrates have been properly prepared.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. The installation of the resilient flooring shall not begin until the work of all other trades has been completed, particularly wet and overhead trades.

E. Areas to receive flooring shall be adequately lighted during all phases of the installation process.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Using Portland based cementitious base leveler fill and cover all seams, nail heads, voids, cracks, and expansion joints. Achieve smooth, even, firmly attached substrate for best finish results.
   1. Float with a Portland cement compound using a latex additive (as recommended by the manufacturer) instead of water.
   2. Once substrate levelness is achieved continue with the next step.

C. Apply concrete floor sealer to substrate in accordance with manufacturer's recommendations.

D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

E. Concrete Substrates: The Contractor shall verify to the Owner and installer a minimum of 30 days prior to the scheduled resilient flooring installation the following substrate conditions. All substrate testing shall be documented and submitted to the Architect and Owner before commencement of the flooring installation.
   1. Verify that substrates are dry, free of debris, and that all curing compounds, sealers, and hardeners have properly cured.

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2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

3.3 INSTALLING RESILIENT TILES AND PLANKS

A. General:
1. Permanent HVAC system shall be turned on and set to a minimum of 65 degrees F (20 degrees C) for a minimum of 48 hours prior to, during and 48 hours after installation. After the installations, the maximum temperature should not exceed 125 degrees F (37 degrees C).
2. All products must be allowed to acclimate at least 24 to 48 hours before installation. This means product must be placed in the same room as the install that is taking place and removed from its factory packaging.
3. Material shall be visually inspected prior to installation.
4. Ensure that all recommendations for sub-floor and jobsite conditions are met prior to beginning the installation. Once the installation is started, Contractor and installer have accepted those conditions.
5. Install in accordance with manufacturer's installation instructions for each product type and application specified.

B. Layout and Installation:
1. Center tiles or planks in rooms and hallways so borders are not less than half a tile or plank when possible.
2. Cut edges shall always be installed against a wall.
3. Install using tile and plank installation techniques recommended by manufacturer.
4. Install tiles, planks, borders and feature strips in locations and configurations indicated on the Drawings.

C. Adhesive Application:
1. Any spread glue has to be covered with material and rolled within the recommended time frame described on the adhesive container.
2. If troweled adhesive skims over, scrape up and reapply.
3. Install in accordance with adhesive manufacturer's recommendations.
4. Refer to manufacturer's literature for selection criteria for trowel size, type.
5. Using proper trowel size, apply adhesive in accordance with label on adhesive.
6. Spread a 4 inch (100 mm) wide band of adhesive around the perimeter of the area designated as an extreme condition area.
7. An additional 4 inch (100 mm) band should be spread at approximately 10 foot (3 m) intervals.
8. For transitional areas, from loose lay to another floor covering of a different height, a 4 inch (100 mm) band of adhesive should be spread across the length of the transition.

3.4 CLEANING

A. Wipe off any adhesive on floor as installation proceeds. Wait 48 hours before applying the cleaning and maintenance products.

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B. Prior to installation of permanent fixtures or furniture, remove all dirt, debris, or residual adhesive and clean the floor. If desired, a protective coating may be applied at this time. Specific products and instructions are available from the manufacturer.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.6 MAINTENANCE

A. Comply with manufacturers instructions for proper cleaning and maintenance of the products.

END OF SECTION 09 65 16

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SECTION 09 67 23 – RESINOUS FLOORING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Resinous Systems of the Following Types:
   1. (Basis of Design) Sherwin-Williams HPF, Resuflor Screed Deco Flake II.

1.2 RELATED SECTIONS

A. Section 03 30 00 – Cast-In-Place Concrete.

1.3 REFERENCES

A. ASTM International (ASTM):
   1. ASTM C 307 - Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings.
   2. ASTM C 413 - Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.
   3. ASTM C 570 - Standard Specification for Oil- and Resin-Base Caulking Compound for Building Construction.
   4. ASTM D 256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
   5. ASTM D 648 - Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
   6. ASTM D 695 - Standard Test Method for Compressive Properties of Rigid Plastics.
   7. ASTM D 696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between minus 22 to 86 degrees F (minus 30 and 30 degrees C) with a Vitreous Silica Dilatometer.
   8. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
   9. ASTM D1475 - Standard Test Method For Density of Liquid Coatings, Inks, and Related Products.
   10. ASTM D 2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
   11. ASTM D 2240 - Standard Test Method for Rubber Property—Durometer Hardness.
   12. ASTM D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
   13. ASTM D2369 - Standard Test Method for Volatile Content of Coatings.
   14. ASTM D 2370 - Standard Test Method for Tensile Properties of Organic Coatings.
   15. ASTM D 3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
   16. ASTM D 4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
   17. ASTM D 4366 - Standard Test Methods for Hardness of Organic Coatings by Pendulum Damping Tests
   18. ASTM D 4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

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19. ASTM D5441 - Standard Test Method for Analysis of Methyl Tert-Butyl Ether (MTBE) by Gas Chromatography.
20. ASTM D 7234 - Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
21. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
22. ASTM F 2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
23. ASTM G 154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials.

B. Deutsches Institut fur Normung (DIN):
   1. DIN 53460 – Testing of Plastics; Determination of the Vicat Softening Temperature of Thermoplastics.

C. International Concrete Repair Institute (ICRI):
   1. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

D. Military Specifications (MIL):
   1. MIL-D-3134J - Deck Covering Materials.

E. National Floor Safety Institute (NFSI):
   1. ANSI/NFSI B101.1 - Test Method for Measuring Wet SCOF of Common Hard-Surface Floor Materials.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data:
   1. Manufacturer's data sheets on each product to be used, including properites, VOC content, wet static coefficient of friction, compressive strength, tensile strength, eloongation and similar properties.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Typical installation methods.

C. Verification Samples: Two representative units of each system, including color and texture.

D. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.

E. Manufacturer’s Certification: Submit manufacturer’s certification that materials comply with specified requirements and are suitable for intended application.

F. Manufacturer’s Project References: Submit manufacturer’s list of successfully completed resinous flooring system projects, including project name and location, name of architect, and type and quantity of flooring systems furnished.

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G. Applicator's Project References: Submit applicator's list of successfully completed resinous flooring system projects, including project name and location, name of architect, and type and quantity of flooring systems applied

H. Care and Maintenance Instructions: Submit manufacturer's care and maintenance instructions, including cleaning instructions.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Applicator's Qualifications:
   1. Applicator regularly engaged, for a minimum of 5 years, in application of resinous flooring systems of similar type to that specified.
   2. Employ persons trained for application of resinous flooring systems.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
   1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
   2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
   3. Retain mock-up during construction as a standard for comparison with completed work.
   4. Do not alter or remove mock-up until work is completed or removal is authorized.

1.6 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and batch number.

B. Storage and Handling Requirements:
   1. Store and handle materials in accordance with manufacturer's instructions.
   2. Keep materials in manufacturer's original, unopened containers and packaging until application.
   3. Store materials in clean, dry area indoors between 65 and 80 degrees F (18 and 27 degrees C).
   4. Store materials out of direct sunlight.
   5. Keep materials from freezing.
   6. Protect materials during storage, handling, and application to prevent contamination or damage.

1.8 PROJECT CONDITIONS

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A. Apply flooring system under the following ambient conditions:
   1. Ambient and Concrete Floor Temperatures: Between 65 and 85 degrees F (18and 29 degrees C).
   2. Material Temperature: Between 65 and 85 degrees F (18 and 29 degrees C).
   3. Relative Humidity: Maximum 80 percent.
   4. Dew Point: Floor temperature more than 5 degrees over dew point.

B. Do not apply flooring system under ambient conditions outside manufacturer's limits.

1.9 WARRANTY

A. Submit manufacturer's standard warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: The Sherwin-Williams High Performance Flooring, 866-540-1299 swflooring@sherwin.com Website: https://industrial.sherwin-williams.com/na/us/en/resin-flooring.html

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

2.2 SHERWIN-WILLIAMS HPF, RESUFLOR SCREED DECO FLAKE II

A. Resuflor Screed Deco Flake II.
   1. Primer Coat: Resflor MPE, 7-9 mils.
   2. Mortar Coat: Resuflor MPE + PT 250 Aggregate, 3/16 to 1/4 inches.
   3. Grout Coat: Resuflor PT 250 Topcoat, 5-8 mils.
   4. Broadcast Coat pigmented with decorative vinyl flake (1/4"): Eco-MPE, 15 mils.
   5. Grout Coat: Resuflor UVE, 15-16 mils.
   6. Topcoat: Resutile HTS 100, 3 mils.
   7. Color Blend: 36% F9975, 36% F9956, and 28% F1820.

2.3 SYSTEM PROPERTIES

A. Resuflor Screed Deco Flake II
   1. Abrasion Resistance Taber Abraser CS-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions, ASTM D4060, 18 mg/loss
   2. Adhesion to Concrete,psi [MPa], ASTM D4541, 450 [3.10] (concrete failed)
   3. Adhesion to Concrete, psi [MPa}, ASTM D7234, 732 [4.48}
   4. Coefficient of Friction-COF, James Friction Tester, ASTM D2047, 0.63
   5. Coefficent of Friction-Wet Static, BOT 3000, ANSI/NSFI B101.1, 0.94
   6. Coefficient of Thermal Linear Expansion, mm/mm/C, ASTM D696, 5.39x10-5
   7. Compression Strength, psi [MPa] (binder resin) ASTM D695, 13,500 [93.08]
   8. Compressive Strength, psi [MPa] ASTM C579, 10,000 [68.95]
   9. Flammability, ASTM D635, 182 mm/min
   10. Izod Impact Strength, lb/in [N/m], ASTM D256, 0.26 [45.53]
   11. König Hardness (3 mil/0.08 mm film) (topcoat resin), ASTM D4366, 171.3
   12. Shore D Hardness, ASTM D2240, 80-85 @ 0 sec | 75-80 @ 15 sec
   13. Sward Hardness (1mil film), ASTM D2240, 35-40

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14. Tensile Strength (binder resin), psi [MPa], ASTM D2370, 8,000 [55.16]
15. Percent Elongation (binder resin), ASTM D2370, 6%
16. Tensile Strength, psi [MPa], ASTM C307, 1,690 [11.65]
17. Volatile Organic Compound, VOC, lb/gal [g/l], ASTM 3960, Resuflor MPE A+B= 0.41 [49] Resuflor PT Topcoat A+B= 0.44 [53] Resuflor UVE A+B=0.67 [81] Resutile HTS 100 A+B+C=0.05 [6]
18. Water Absorption (24 hours), ASTM D570, 0.2% weight increase

2.4 PRODUCT PROPERTIES

A. Resuflor MPE: A neutral, two-component, high solids epoxy.
   1. Percent Solids, by weight (by volume), ASTM D1475, A + B: 95.45 (94.56).
   2. Volatile Organic Compound-VOC, ASTM D3960, Mixed A + B: 0.41 lb./gal (49 g/L).
   3. Abrasion Resistance, mg loss, Taber Abraser, C-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions, ASTM D4060: 83.1.
   4. Coefficient of Friction-COF, James Friction Tester, ASTM D2047: 0.59-0.62.
   5. Adhesion to Concrete, ASTM D5441: 732 psi (4.48 MPa) concrete failed.
   6. Adhesion to Concrete, ASTM D7234: 450 psi (3.10 MPa) concrete failed.
   7. Compressive Strength, ASTM D695: 13,500 psi (93.079 MPa).
   8. Tensile Strength, ASTM D2370: 8,000 psi (55.158 MPa).
   9. Percent Elongation, ASTM D2370: 5.
   10. Shore D Hardness, ASTM D2240: 80-85 @ 0 sec, 75-80 @ 15 sec.

B. Resuflor PT 250: A three-component filled, 100 percent solids epoxy system for resurfacing eroded interior concrete floors.
   1. Percent Solids, by weight (by volume), ASTM D2369 A + B + C: 99.52 (98.8).
   2. Volatile Organic Compounds-VOC, ASTM D3960, A + B + C: 0.09 lb./gal (11 g/L).
   3. Coefficient of Friction-COF, James Friction Tester, ASTM D2047: 0.60-0.63 (with seal coat and topcoat of PT Topcoat).
   4. Coefficient of Thermal Liner Expansion, ASTM D696: 0.0000197 mm/mm/degrees C.
   5. Adhesion to Concrete, ASTM D4541: 732 psi (4.48 MPa) (concrete failed)..
   6. Adhesion to Concrete, ASTM D7234: 450 psi (3.10 MPa) (concrete failed)
   7. Compressive Strength, ASTM C570: 10,000 psi (68.95 MPa).
   8. Flexural Strength, ASTM D790: 3,700 psi (25.51 MPa).
   9. Flexural Modulus of Elasticity, ASTM D790: 180,000,000 psi (100,000 MPa).
   10. Heat Deflection Temperature, ASTM D648: 140 degrees F (60 degrees C) @ 264 psi (1.82 MPa) load, 151 degrees F (66 degrees C) @ 66 psi (0.46 MPa) load.
   11. Izod Impact Strength, ASTM D256: 0.26 l/in (45.53 N/m).
   12. Tensile Strength, ASTM C307: 1,690 psi (11.65 MPa).
   13. Shore D Hardness, ASTM D2240: 80-85 @ 0 sec, 75-80 @ 15 sec.

C. Resuflor PT Topcoat: A high solids, thickened epoxy for sealing an overlay or if an “orange peel” texture is desired.
   1. Percent Solids, by weight (by volume), ASTM D2369, A + B: 95.12 (94.92) .
   2. Volatile Organic Compound-VOC, ASTM D3960, A + B: 0.44 lb./gal (53 g/L).
   3. Abrasion Resistance, mg loss, Taber Abraser, CS-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions, ASTM D4060: 83.
   4. Tensile Strength, ASTM D2370: 8,000 psi (55.16 MPa).
   5. Percent Elongation, ASTM D2370: 5.
   6. Shore D Hardness, ASTM D2240: 75-80 @ 0 sec, 70-75 @ 15 sec.

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D. Resuflor UVE: A two-component, high solids, UV resistant epoxy.
   1. Percent Solids, by weight (by volume), ASTM D2369, A + B: 92.60 (92.11).
   2. Volatile Organic Compound-VOC, ASTM D3960, A + B: 0.67 lb./gal (81 g/L).
   3. Abrasion Resistance, mg loss, Taber Abraser, C-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions, ASTM D4060: 80-90.
   4. Coefficient of Friction-COF, James Fricion Tester, ASTM D2047: 0.59-0.62.
   5. Compressive Strength, ASTM D69: 13,500 psi (93,150 MPa).
   6. Tensile Strength, ASTM D2370: 8,000 psi (55,158 MPa).
   7. Present Elongation, ASTM D2370: 5.
   8. Shore D Hardness, ASTM D2240: 80-85 @ 0 sec, 70-85 @ 15 sec.

E. Resutile HTS 100: A clear high solids, three-component, satin finish, aliphatic, moisture-cure urethane.
   1. Percent Solids, by weight (by volume), ASTM D2369, A + B + C: 94.02 (92.57).
   2. Volatile Organic Compound-VOC, ASTM D3960, Mixed A + B + C: 0.05 lb/gal (6 g/L).
   3. Abrasion Resistance, mg loss, Taber Abraser, C-17 Taber Abrasion Wheel, 1,000 gram load, 1,000 revolutions, ASTM D4060: 18.
   4. Coefficient of Friction-COF, James Friction Tester, ASTM D2047: 0.63.
   5. Wet Static Coefficient of Friction, BOT 3000, ANSI/NFSI B101.1: 0.94.
   6. Flammability, ASTM G154: 182 mm/min.
   7. Resistance to Yellowing as measured using ASTM D2244 after 1000 consecutive hours UV exposure in QUV, ASTM G154, <10 increase of yellow units (CIE Lab Δb)
   8. Tensile Strength, (resin only), ASTM D2370: 6,250 psi (43,092 MPa).
   9. Percent Elongation, (resin only), ASTM D2370: 6.
   10. König Hardness, (3 mil/76.2 micron film), ASTM D4366: 171.3.
   11. Water Absorption, 24-hour immersion, ASTM C413: 0.2 percent weight increase.

F. Decorative Flake: Water-based resin material, inorganic minerals, additives, integrally pigmented.
   1. Shape: Random.
   2. Size: 1/4"
   3. Surface Texture: Smooth.
   4. Color Blend: 36% F9975, 36% F9956, and 28% F1820.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine concrete surfaces to receive flooring system. Verify concrete is structurally sound.

B. Moisture Testing of Concrete: Perform at least one of the following two tests to determine moisture in concrete. Type of test and frequence as recommended by manufacturer and installer.
   1. In-situ Probe Test:
      a. Measure relative humidity in concrete in accordance with ASTM F 2170.
      b. Application of flooring system shall start only if test results are below 77 percent relative concrete humidity.
      c. If test results are above limits, notify Architect and flooring manufacturer in writing.

C. Do not begin preparation or installation until satisfatory moisture test results are achieved. Provide flooring manufacturer's recommended moisture vapor control coating if required.

3.2 PREPARATION

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A. Clean surfaces thoroughly prior to installation.

B. Protection of In-Place Conditions: Protect adjacent surfaces and adjoining walls from contact with flooring system materials.

C. Surface Preparation:
   1. Prepare concrete surface in accordance with manufacturer's instructions.
   2. Remove dirt, dust, debris, oil, grease, curing agents, bond breakers, paint, coatings, sealers, silicones, and other surface contaminants which could adversely affect application of flooring system.
   3. Steel shot blast concrete to a minimum surface profile of ICRI 310.2R, CSP 5.
   4. Key-cut termination points with 1/4-inch (6-mm) by 1/4-inch (6-mm) cut.
   5. Patch depressions, divots, and cracks in concrete in accordance with manufacturer's instructions.
   6. Mechanically remove loose, delaminated, and damaged concrete and repair in accordance with manufacturer's instructions.
   7. Joints: Fill joints in accordance with manufacturer's instructions.

3.3 INSTALLATION

A. Install flooring system in accordance with manufacturer's instructions and approved submittals at locations indicated on the Drawings.

B. Ensure concrete is dry, clean, and prepared in accordance with manufacturer's instructions.

C. Allow concrete to cure a minimum of 7 days before applying flooring system.

D. Mixing:
   1. Mix material components together in accordance with manufacturer's instructions.
   2. Mix only enough material that can be applied within working time.
   3. Add and mix colorants with materials in accordance with manufacturer's instructions to achieve uniform color.

E. Apply flooring system materials to obtain consistent mil thickness and smooth, uniform appearance and texture.

F. Overlay: Apply overlay in accordance with manufacturer's instructions. Apply overlay to prepared concrete surface.

G. Traction Aggregate: Broadcast traction aggregate in accordance with manufacturer's instructions. Broadcast traction aggregate into wet overlay.

H. Cove:
   1. Apply cove primer and cove in accordance with manufacturer's instructions at locations indicated on the Drawings.
   2. Apply cove to height and shape as indicated on the Drawings.
   3. Apply cove to create seamless, smooth transition between flooring and walls.

I. Seal Coat:
   1. Apply seal coat in accordance with manufacturer's instructions.
   2. Apply seal coat over traction aggregate.

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3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.5 CLEANING AND PROTECTION

A. Allow flooring system to dry in accordance with manufacturer's instructions before opening to traffic.

B. Allow flooring system to dry a minimum of 1 week before cleaning by mechanical means.

C. Protect completed flooring system from damage during construction.

END OF SECTION 09 67 23

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SECTION 09 90 00 – PAINTING AND COATING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

A. Refer to Room Finish Schedules, Material Schedules, notes on the drawings , Section 6 and this Section of the specifications to determine building surfaces to be painted or otherwise finished.

WARRANTY

A. All painting and caulking shall be warranted for 2 years against becoming unserviceable or objectionable in appearance as a result of being defective or non-conforming. Without limiting the warranty scope, the work in general shall be warranted not to:
   1. Noticeably discolor, yellow, streak, bloom, bleak, darken or fade.
   2. Change sheen with excessive speed or irregularity.
   3. Peel, crack, blister or alligator.
   4. Release from the substrate or intermediate coats.
   5. Chalk or dust excessively.
   6. Stay tacky or become tacky.
   7. Mildew

SUBMITTALS

A. Samples:
   1. Submit three paper chip samples, 8 1/2" by 11” in size, illustrating range of colors available for each surface finish product as scheduled.
   2. Colors shall be in accordance with furnished schedules. Provide samples of every color and finish required.
   3. Prepare at project site on a material similar in texture to that which it is to be applied.

B. Submit technical data sheets describing properties and application recommendations from manufacturers providing materials on the project.
   1. Manufacturer’s printed VOC data.

C. Provide actual samples of stained work prepared by painting contractor on pieces of actual wood to be used on the project obtained from millwork supplier.

SCHEDULE

A. Based upon submittals, the Architect will prepare a paint and finish schedule identifying all materials and colors to be used on the project.

MATERIALS

A. The bid shall be based upon all paint, enamel, latex, fillers, thinners and other materials listed in the following schedule.

B. Thinners shall only be those recommended by the particular paint manufacturer for use with his products.

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C. Use proper colored bases to mix colored paints. Prime coats shall be colored nearly the same as finish coats.

D. The Architect reserves the right to select a different color for each room or space and to have colors adjusted at any time before the final coat is applied.

E. Refer to Section 01 60 00 – Extra Stock.

ACCEPTABLE MANUFACTURERS

A. Best grade commercial products of the following manufacturers will be acceptable for use on the project.
   1. Sherwin-Williams
   2. Benjamin Moore
   3. PPG
   4. Devoe
   5. Pratt & Lambert
   6. Olympic Stain Products
   7. U.S. Gypsum Company

PREPARATION

A. Deliver all materials in unbroken original packages or containers bearing manufacturer's labels.

B. All material shall be stored and mixed only in such rooms as may be assigned for this purpose and all necessary precautions shall be taken to prevent a fire.

C. Protect all finished surfaces and all surfaces receiving other materials, which depend on surface bonding, from becoming contaminated by any painting or coating.

D. Coordinate and schedule painting work so as not to conflict with the work of other trades.

E. Preparation of surfaces:
   1. Wood:
      a. Sandpaper to smooth and even surface and slightly bevel sharp corners. Clean off all dust, using tack cloth if necessary. After primer has been applied fill nail and other holes and cracks with plastic wood or putty.
   2. Steel and Iron:
      a. Remove grease, rust, scale and dust and touch-up any chipped or abraded places on items that have been shop coated. Where steel and iron have a heavy coating of scale, it shall be removed by wire brushing or sand blasting as necessary to produce a satisfactory surface for painting. Painting over rust and scale will not be allowed.
   3. Galvanized Metal:
      a. Clean thoroughly with mineral spirits or naptha.
   4. General:
      a. Before painting, hardware, accessories, electrical device plates, lighting fixtures and similar items shall be removed by the installing trade and be replaced after painting work is completed. If items are not removed prior to painting and are damaged they must be repaired or replaced at no additional cost to the Owner.

APPLICATION

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A. Apply materials in a manner to insure smooth, even, uniform coats, free from dirt, runs, brush marks, sags and laps. Apply all paint products in accordance with manufacturer's written instructions.

B. Doors and trim and steel door frames shall be brushed or sprayed. Interior surfaces of stops, exposed to view, retaining glass shall be painted prior to installation of glass.

C. All applications, other than on millwork, doors and frames, shall be by brush, spray or roller as recommended by coating manufacturer to produce the best finish. Semi-transparent stain shall be brushed only.

D. All coats shall be thoroughly dry before the succeeding coat is applied. Allow at least 24 hours between coats.

E. Sandpaper with number 00 sandpaper between all interior coats on wood or metal surfaces. Steel wool may not be used.

F. All finishes of each type of paint shall be uniform as to sheen, color and texture.

G. Prime and back-prime with one coat of primer all surfaces of millwork, trim and woodwork, both interior and exterior. Priming work shall be done when such millwork is first delivered to the job.

H. Give top and bottom edges of all doors two coats of the same finish applied to faces. Edge finishes on door tops and bottoms shall be applied after all cutting and fitting of door is completed and before weatherstripping is applied.

I. Miscellaneous ungalvanized steel not exposed in finished areas shall be touched-up to cover bolts, field welds, and all damaged and scuffed areas, immediately after erection, using the same material as used in shop prime coating. One further coat of original priming material shall be given to all surfaces after touch-up primer has dried.

TOUCH-UP & CLEAN-UP

A. On completion of the building, examine all painted surfaces. Carefully touch-up and repair marred or damaged spots, work over all surfaces that have been repaired by other trades and leave entire work in first class condition.

PAINTING FINISH SCHEDULE

A. New interior gypsum walls and ceilings:
   1. Tape all joints and spread compound over nail or screw heads using perforated tape and joint compound. (Tape and float areas above ceilings which are not finished also).
   2. Sand first operation as required, trowel compound out to feather edge over all joints, nail or screw heads and around accessories.
   3. Sand second operation as required and apply one coat of combination textured paint containing sealer and primer with a simulated sand finish texture. Submit texture samples to the Architect for approval.
   4. Apply 1 coat Sherwin-Williams ProMar 200, Zero VOC, Interior Latex Primer
   5. Apply 2 coats Sherwin-Williams ProMar 200, Zero VOC, Interior Latex, low sheen paint.
   6. Interior Latex Eg-Shel for Walls, Interior Latex Flat for Ceilings

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B. New interior exposed concrete block:
   1. Clean & degrease:
   2. Apply 1 coat PrepRite Interior/Exterior Latex Block Filler
   3. Apply 2 coats Sherwin-Wililams ProMar 200, Zero VOC, Interior Latex Semi-Gloss

C. New interior exposed concrete block: (Food Service Areas, Toilets, Locker Rooms and Showers)
   1. Clean & degrease:
   2. Apply 1 coat PrepRite Interior/Exterior Latex Block Filler
   2. Apply 2 coats Sherwin-Williams Pro Industrial DTM Acrylic Gloss Coating.

D. Interior and exterior exposed structural framing and steel joists, baffle system uni-strut supports, metal door and window frames, interior metal guard railings, handrails, interior metal ladders, primed portions of rolling overhead doors and metal lite kits in wood doors: (At frames with glass lites and lite kits in wood doors, paint inside of fixed and applied stops prior to setting glass)
   1. 1st coat – Touch up factory primed surfaces. Pro Industrial Pro-Cryl Universal Acrylic Primer
   2. 2nd & 3rd coats – Sherwin-Williams Pro Industrial DTM Acrylic Eg-Shel Industrial enamel.

E. Exterior metal frames, bollards, ornamental iron gates, steel lintels and structural framing.
   1. 1st coat – Touch up factory primed surfaces or apply primer (as recommended by paint manufacturer for each substrate).
   2. 2nd & 3rd coats – Sherwin-Williams Pro Industrial DTM Acrylic Eg-Shel Industrial enamel

F. Painted interior, plywood and trim, plywood telephone/computer equipment boards:
   1. 1st coat – Sherwin-Williams ProBlock Interior Oil-Based Primer
   2. 2nd & 3rd coats – Sherwin-Williams 200 Interior Alkyd semi-gloss enamel.

G. Stained wood sills, cabinets and shelving, and interior woodwork, trim, plywood seating and railings
   1. Apply paste filler and satin sheen oil stain. Color as selected by Architect.
   2. Apply 3 coats clear satin sheen – Sherwin-Williams Wood Classics Polyurethane Varnish

H. Interior and exterior mechanical, plumbing and electrical equipment, including machinery, roof top A/C units, electrical switches and panels, meters, piping and conduits, uninsulated water and sewer lines and similar items (excluding copper) exposed to view: Mask all equipment nameplates and information plates or tags.
   1. 1st coat on primed or factory painted equipment - Touch-up scars and scratches with primer.
   2. 1st coat on black steel - Maintenance primer.
   3. 2nd & 3rd coats - Satin sheen industrial enamel.

I. Blackout duct interiors in sight line, but not less than 15” back from registers, grilles and diffusers:
   1. One coat flat, wrought iron, black.

COLORS

A. Interior/Exterior Finish Colors are scheduled on drawings. Colors of paints (including stains) shall match control samples.

B. Traffic Paint
   1. Parking Stall Strips: White

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2. Crosswalks: State of Texas Reflective Yellow
3. Painted Medians: State of Texas Reflective Yellow
4. Handicap Curb Ramps: State of Texas Reflective Yellow
5. Fire Lanes: Red.

COMPLETION

A. Furnish Owner a typewritten list of paint schedule in duplicate, listing manufacturer's names, types of paint and color numbers or custom mix formulas.

END OF SECTION 09 90 00

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SECTION 10 14 00 – GRAPHICS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SECTION INCLUDES

A. Include in Base Proposal the amount for furnishing and installing the following signage in locations as indicated on the Drawings:
1. Room identification signage
2. Restroom signage
3. Exit signage.
4. Cast Aluminum Building Letters
5. Dedication Plaque
6. Brackets, clips, posts, fasteners, and all accessories required for proper installation of signage

SUBMITTALS

A. Product Data:
   1. Manufacturer's specifications and other data needed to prove compliance with specified requirements.
   2. Manufacturer's installation instructions.

B. Shop Drawings:
   1. Indicating materials, sizes, and finishes, details of fabrication and installation, fasteners and hardware, attachments, related and adjacent work.

C. Samples:
   1. One (1) actual sample of each type room identification sign with specified finish.
   2. One (1) 6 inch x 6 inch sample of cast metal plaque material with specified finish.

QUALITY ASSURANCE

A. Americans with Disabilities Act (ADA)

B. Texas Accessibility Standards (TAS)

ACCEPTABLE MANUFACTURERS

A. Specifications are based on products and manufacturers listed as basis of specification or design. Products of manufacturers listed which meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five (5) years experience manufacturing products meeting or exceeding the specifications and comply with Division 1 requirements regarding substitutions to be considered. All deviations from basis-of-design listed in drawings shall be required to submit substitution request during bidding to be evaluated by Architect.

MATERIALS

A. Room Identification Signage
   1. General:

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a. Constructed of one (1) or two (2) high pressure laminate in colors indicated on drawins, laminated to a 1/8 inch thick acrylic back.
b. Signage shall have radius or square corners with square-cut edges painted a color as selected by Architect.
c. Demarcation line, if any, shall be infilled to match copy color.
d. Signs shall comply with all state and federal codes, including, but not limited to the ADA and TAS requirements.
e. Refer to drawings for signage details for dimensions, types, colors, graphic layout, and mounting and height specifications.

2. Room Numbers, Symbols, and Restroom Copy:
   a. Shall be matte finished acrylic, raised 1/32 inch, of a color contrasting to the face laminate.
   b. Characters and pictograms shall be chemically welded to the acrylic backing, through the face laminate, to assure permanent adhesion.
   c. Room numbers and restroom copy shall be accompanied by Grade II braille by means of “VisiTouch Duradot System”. Glass or metallic “Durodots” shall have 0.059 inch surface diameter with body of sphere pressure secured below face laminate. Routed boxes or glued on dots are not acceptable.
3. Lower or Secondary Copy:
   a. Shall be a minimum of 5/8 inch high incised sans serif style, (Helvetica, Optima, Futura as selected by Architect), all caps, paint-filled in a color as selected by Architect.
4. Restroom Pictograms:
   a. Shall appear on a minimum six (6) inch square, unobstructed field.
5. Fasteners and Accessories:
   a. 1/8 inch thick, double-sided foam tape of type recommended to suit application and commercial grade silicone sealant.
   b. Back-up plates shall be supplied, where shown or required, for signage mounted on glass.
6. Provide all materials required for a complete installation.
7. Approved Manufacturers:
   a. Signage:
      1) South Texas Graphic Specialties, Inc., Houston, TX; (713) 467-4499 (Basis of Specification)
      2) Stanley Signature Signs, Katy, Texas; (281) 395-6106
      3) ProWorx Architectural Signage, Houston, Texas; (713) 666-3131
      4) Motivational Systems, Inc. San Antonio, TX; (210) 805-9555
   b. Plastic Laminate:
      1) Nevamar (Basis-of-Design)
      2) Wilsonart
      3) Pionite
      4) Formica
      5) Panolam

B. Building Letters:

1. Provide cast aluminum letters with pre-finished finish as manufactured by The Southwell Company, P.O. Box 299, San Antonio, TX 78291-0299. Phone (210) 223-1831 or equal.

2. Letters shall be cast from 319 aluminum alloy with Pre-finished Aluminum with finish as Bronze Anodized.

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3. Letters shall be as shown on building interior and exterior elevations. Letters shall Arial style font. Refer to drawings for sizes. Provide full scale template for size verification and Architect's approval prior to fabrication and installation.

4. Mounting style shall be P-8 projection mount with collars and threaded studs set in plate steel or metal wall panel. Refer to drawings.

C. Cast Metal Dedication Plaque:
   1. Material and Fabrication:
      a. Casting: Shall be of virgin ingots of F-214 Aluminum Alloy and shall be free of pits and gas holes and all letters shall be sharp and hand tooled.
      b. Border Style: Single line standard border design.
      c. Letter Style/Sizes: Shall be Helvetica Medium in both upper and lower case letters, unless shown otherwise. Letter sizes shall be as shown on drawings.
      d. Finishes:
         1) Borders and Letter Faces: Shall be satin finish.
         2) Background: Shall be leatherette texture sprayed with Gun Metal Gray acrylic lacquer.
         3) Plaque shall be chemically cleaned and etched and treated with alodine.
         4) Completed plaque shall be sprayed with two (2) coats of clear acrylic lacquer.
      e. Size: Shall be as shown on drawings.
   2. Fasteners and Attachment Hardware: Concealed fasteners and hardware of size and type recommended by manufacturer for attachment of plaque on brick wall where indicated on drawings.
   3. Provide all materials required for a complete installation.
   4. Approved Manufacturers:
      a. A.R.K. Ramos Architectural Signage Systems, Oklahoma City, OK; (405) 235-5505
      b. Best Manufacturing Sign Systems, Montrose, CO; (800) 235-2378
      c. York Bronze Company, Bryan, TX; (800) 488-4662
      d. Corpus Christi Stamp Works, Inc., Corpus Christi, TX; (361) 884-4801
      e. Matthews Bronze, Pittsburgh, PA; (800) 950-1317
      f. Metal Arts, Division of L & H Mfg. Co., Mandan, ND; (800) 237-8069
      g. ProWorx Architectural Signage, Houston, Texas; (713) 666-3131
      h. The Southwell Co., San Antonio, TX; (210) 223-1831

INSTALLATION

A. Room Identification Signs:
   1. Install in accordance with manufacturer's instructions.
   2. Install (1) sign at all interior door locations except restrooms.
   3. Install with double-sided foam tape and a bed of silicone sealant.

B. Restroom Signs:
   1. Install in accordance with manufacturer's instructions.
   2. Install (1) sign at corridor side of all restrooms.
   3. Install with double-sided foam tape and a bed of silicone sealant.

C. Cast Aluminum Letter:
1. Install in accordance with manufacturer's instructions.
2. Install in location shown on drawings.
3. Install with projection mount and stand-offs in steel plate or masonry veneer.

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D. Exit Signs:
   1. Install in accordance with manufacturer’s instructions.
   2. Install (1) sign at all exterior door locations.
   3. Install with double-sided foam tape and a bed of silicone sealant.
   4. Where shown or required, mount signs on glass using back-up plates.

E. Cast Metal Dedication Plaque:
1. Install in accordance with manufacturer’s instructions.
2. Install in Interior location as directed by Owner and Architect.
3. Install with concealed fasteners of threaded bolt screwed into back of plaque and inserted into masonry backup

END OF SECTION 10 14 00

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SECTION 10 14 13 – FABRICATED ALUMINUM LETTERS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SCOPE

A. Furnish letters/logos and hardware necessary to install Fabricated Aluminum shown on drawings and herein specified.

SUBMITTALS

A. Manufacturer's illustrated product literature and specifications.

B. Manufacturer's installation instructions.

QUALITY ASSURANCE

A. Manacturer to have a minimum of 10 years experience in manufacturing letters.

B. All letters to be manufactured by single source.

PRODUCTS

A. Manufacturers:
   a. Gemini Incorporated, Cannon Falls, MN; (800) 538-8377 (Basis of Specification)
   b. A.R.K. Ramos Architectural Signage Systems, Oklahoma City, OK; (405) 235-5505
   c. Corpus Christi Stamp Works, Inc., Corpus Christi, TX (361) 884-4801
   d. Best Manufacturing Sign Systems, Montrose, CO; (800) 235-2378
   e. York Bronze Company, Bryan, TX; (800) 488-4662
   f. Matthews Bronze, Pittsburgh, PA; (800) 950-1317
   g. Metal Arts, Division of L & H Mfg. Co., Mandan, ND; (800) 237-8069
   h. ProWorx Architectural Signage, Houston, Texas; (713) 666-3131
   i. The Southwell Co., San Antonio, TX; (210) 223-1831

MATERIALS

A. High Grade, Aluminum 5052 Alloy

CONSTRUCTION

A. Material Gauge: Fabricated Aluminum faces produced with .090" aluminum. Returns produced with .063" aluminum.

B. Construction: Letter returns cut from .063" coil 3" to size based on desired letter depth and bent to the contour of the faces to produce hollow-backed letter with 90 degree angle edges. Inside joints are MIG welded with 1"-1 1/2" intervals.

C. Tesing: Welds are tested for strength. Finishes are Salt Fog tested to ASTM B-117-95 for corrosion resistance.

D. Finishes: Fabricated Aluminum is cut from raw 2B Aluminum.

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FINISH

A. 5052 Alloy Aluminum
   2. Brushed finish –vertical grain, brushed face, clear coated with low gloss acrylic polyurethane.

FABRICATED CONSTRUCTION

A. Solid Face with Backs.
B. Lexan Backs
   1. Removable, flush, .1236 clear lexan.
C. Mounting:
   1. 1/4-20 threaded studs, aluminum.
D. Lit Fabricated with LEDs
   1. Back (Halo) lit letters with removable clear Lexan backs.
E. Letters shall be in size and font as shown on elevations.

INSTALLATION

A. A qualified installer shall install fabricated letters. Additional structural support may be required.

WARRANTY

A. Letters should be guaranteed for the life of the business agianst defects.

END OF SECTION 10 14 13

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SECTION 10 14 23 – CUT METAL SIGNAGE

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SECTION INCLUDES

A. Furnish hardware necessary to install Cut Metal letters and logos, shown on drawings and herein specified.

SUBMITTALS

A. Manufacturer's illustrated product literature and specifications

B. Installation Instructions.

C. Shop Drawings:
   1. Indicating materials, sizes, and finishes, details of fabrication and installation, fasteners and hardware, attachments, related and adjacent work.

QUALITY ASSURANCE

A. Manufacturer to have a minimum of 25 years experience in manufacturing letters and logos.

B. All letters to be manufactured by one manufacturer.

ACCEPTABLE MANUFACTURERS

A. Specifications are based on products and manufacturers listed as basis of specification or named. Products of manufacturers listed which meet or exceed the specifications are approved for use on the Project. Other manufacturers must have a minimum of five (25) years experience manufacturing products meeting or exceeding the specifications and comply with Division 1 requirements regarding substitutions to be considered.

B. Approved Manufacturers:
   1. Gemini Incorporated, Cannon Falls, MN; (800) 538-8377 (Basis of Specification)
   2. Corpus Christi Stamp Works, Inc., Corpus Christi, TX (361) 884-4801
   3. A.R.K. Ramos Architectural Signage Systems, Oklahoma City, OK; (405) 235-5505
   4. ProWorx Architectural Signage, Houston, TX; (713) 666-3131
   5. The Southwell Co., San Antonio, TX; (210) 223-1831)

MATERIALS

A. Aluminum – 5052 Alloy: 3/8", 1/2", 3/4" or 1" thick.

GENERAL CONSTRUCTION

A. Cutting:
   1. Flat Cut: Lazer of Waterjet cut (based on Metal, Gauge and Product), using computer-guided equipment.
   2. Premium Finish (over 3" high): using computer guided equipment.

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FINISHES

A. Aluminum
   1. Painted face & returns (standard or custom colors – refer to drawings), 5052 Alloy, bead-blasted returns, sprayed with acrylic polyurethane (1.75 +/- .25 mils thick) gloss sheen standard, oven baked.

MOUNTING HARDWARE

A. Blind stud standard, available aligned for Metal Building Structure. Optional Single of Double Rail, Top/Bottom Rail, Bottom angle Bracket (min. 3/8” thick), Top or Bottom Stud (min. 3/8” thick). Tie-backs recommended for any Top & Bottom mounts on letters over 8” high.

INSTALLATION

A. A qualified installer shall install Cut Metal letters and logos. Additional structural support may be required on larger and heavier Letters & Logos. Stronger adhesives, such as Epoxy may be required to install with studs on heavier products.

WARRANTY

A. Letters and logos should be guaranteed for the life of the business against defects.

MAINTENANCE

A. Cleaning as needed per manufacturer recommendations.

END OF SECTION 10 14 23

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SECTION 10 21 00 –TOILET PARTITIONS

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Solid plastic toilet compartments including the following: (Hiny Hiders)
   1. Floor mounted overhead-braced toilet compartments.
   4. Privacy screens.

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications.

B. Section 06 10 00 - Rough Carpentry.

1.3 REFERENCES

A. ASTM A666 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Provide layout drawings and installation details with location and type of hardware required.

D. Verification Samples: For each finish product specified, two samples representing actual product, color, and patterns.

E. Sustainable Design Submittals:
   1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
   2. Regional Materials: Certify distance between manufacturer and Project.

1.5 QUALITY ASSURANCE

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A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.

B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.

C. Materials: Doors, panels and pilasters, constructed from high density polyethylene (HDPE) resins. Partitions to be fabricated from polymer resins compounded under high pressure, forming a single component which is waterproof, nonabsorbent and has a self-lubricating surface that resists marks from pens, pencils, markers and other writing instruments. Cover all plastic components with a protective plastic masking.

D. Performance Requirements:
   1. Fire Resistance: Partition materials shall comply with the following requirements, when tested in accordance with ASTM E 84, Class B:
      a. Tested to Meet ASTM E84, Class B flame spread/smoke developed rating.
   2. Material Fire Ratings:
      a. National Fire Protection Association (NFPA) 286: Pass.
      b. International Code Council (ICC): Class B.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

A. Manufacturer guarantees its plastic against breakage, corrosion, and delamination under normal conditions for 25 years from the date of receipt by the customer. If materials are found to be defective during that period for reasons listed above, the materials will be replaced free of charge. Labor not included in warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Scranton Products, which is located at: 801 E. Corey St.; Scranton, PA 18505; Toll Free Tel: 800-445-5148; Fax: 855-376-6161; Email:request info (info@scrantonproducts.com); Web:http://www.scrantonproducts.com
   1. Fabricator: Santana Toilet Partitions.
   2. Fabricator: Comtec Toilet Partitions.
   3. Fabricator: Capitol Toilet Partitions.

B. Substitutions: Not permitted.

2.2 MATERIAL

A. Plastic Panels: High density polyethylene (HDPE) suitable for exposed applications, waterproof, non-absorbent, and graffiti-resistant textured surface.

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B. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.

C. Stainless Steel Castings: ASTM A167, Type 304.

D. Aluminum: ASTM 6463-T5 alloy.

2.3 SOLID PLASTIC TOILET COMPARTMENTS

A. Basis of Design: Hiny Hiders Toilet Partitions as manufactured by and supplied by Scranton Products.
   1. Style: Floor mounted overhead-braced toilet compartments.

B. Doors, Panels, and Pilasters: 1 inch (25 mm) thick with all edges rounded to a radius. Mount doors and dividing panels based on height of specified system.
   1. Door and Panel Height: 55 inches (1397 mm).
   2. Aluminum heat sink fastened to bottom edges.
   3. Door Design: Traditional 2600.
   4. Panel Edge: Standard.
   5. Pilasters: 82 inches (2083 mm) high and fastened to floor.

C. Panel Color: Warm series.
   1. Mahogany - Orange Peel.

G. Pilaster Shoes: 3 inches (76 mm), 20 gauge stainless steel. Secured to pilasters with a stainless steel tamper resistant Torx head sex bolt.
   1. Pilaster Plastic Shoe Color: Silver (Matches Stainless/Aluminum Hardware).

I. Headrail: Heavy-duty extruded 6463-T5 alloy aluminum with anti-grip design. Finish to be clear anodized. Fastened to headrail brackets with stainless steel tamper resistant Torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant Torx head screws.
   1. Headrail Brackets: 20 gauge stainless steel with satin finish. Secured to the wall with stainless steel tamper resistant Torx head screws.

J. Wall Brackets:
   1. Aluminum Brackets: Heavy-duty aluminum 6463-T5 alloy.
   2. Brackets are fastened to pilasters with stainless steel tamper resistant Torx head screws and fastened to the panels with stainless steel tamper resistant Torx head sex bolts.
   3. Bracket Type: Stirrup double ear aluminum.

K. Door Hardware:
   1. Continuous Aluminum Hinge:
      a. Length: 54 inches (1372 mm).
   2. Door Strike/Keeper: Heavy-duty extruded aluminum 6436-T5 alloy with a clear anodized finish. Secured to pilasters with stainless steel tamper resistant Torx head sex bolts. Bumper shall be made of extruded black vinyl.
      a. Style: 6 inches (152 mm) aluminum.
   3. Latch Mechanism: Occupancy Indicator Latch and Housing:
      a. Material: Satin stainless steel.
      b. Occupancy indicators: Green for occupied and red not occupied.
      c. Slide bolt and button.

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4. Doors supplied with one coat hook/bumper and door pull, clear anodized aluminum or stainless steel.
5. Equip outswing handicapped doors with second door pull and door stop.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Examine areas to receive toilet partitions for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install partitions rigid, straight, plumb, and level manor, with plastic laid out as shown on shop drawings.

C. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/8 inch (9.5 mm).

D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.

E. Finished surfaces shall be cleaned after installation and be left free of imperfections.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 10 21 00

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SECTION 10 28 13 – TOILET ROOM ACCESSORIES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SECTION INCLUDES

A. Toilet room and miscellaneous accessories installed throughout the facility specified herein.

RELATED SECTIONS

A. Section 04 20 00 - Unit Masonry
B. Section 05 40 00 - Cold-Formed Metal Framing
C. Section 09 21 16 - Gypsum Board Assemblies
D. Section 09 30 00 - Tiling
E. Section 10 21 13 – High Density Polymer Toilet Partitions
F. Section 26 00 00 - Electrical

SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:
   1. Construction details and dimensions.
   2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Material and finish descriptions.
   4. Features that will be included for Project.
   5. Manufacturer's warranty.

B. Product Schedule: Tabular or spreadsheet format indicating types, quantities, sizes and installation locations by room of each accessory required.

C. Provide statement from Installer that all mounting heights, clearances, and reach ranges for accessories have been reviewed and confirmed to be in compliance with Texas Accessibility Standards as required.

QUALITY ASSURANCE

A. Comply with ANSI A117.1 and Texas Accessibility Standards (TAS) for age-appropriate mounting heights, reach ranges and clearances required.

B. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

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B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

WARRANTY

A. Warrant the work specified herein for three (3) years, or provide manufacturer's standard warranty for specified products, against becoming unserviceable or causing an objectionable appearance resulting from either defective or non-conforming materials and workmanship.

B. Defects shall include, but not be limited to:
   1. Delamination or deterioration of finish.
   2. Noisy, rough or difficult operation.
   3. Failure to meet specified quality assurance requirements.

MANUFACTURERS

A. Toilet Accessories - General:
   1. Bobrick Washroom Equipment, Inc. (BWE)
   2. Bradley Corporation (BRAD)
   3. American Specialties, Inc.(ASI)
   4. Substitutions: Under provisions of Section 01 25 00.

B. Specifications are based on products of Bobrick Washroom Equipment, Inc., (281) 362-7515, unless specific manufacturer is noted otherwise.

C. Owner Furnished/Contractor Installed Liquid Soap Dispensers, Toilet Paper Dispensers, and Paper Towel Dispensers. Contractor to coordinate supply of dispensers with owner and install per TAS.

MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 22 gauge minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.

D. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

F. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

G. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, 1/4 inch thick.

H. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

FINISHING

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A. Stainless Steel: No. 4 satin brushed, typical on all accessories unless otherwise noted.

B. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats vitreous enamel.

C. Chrome/Nickel Plating: Satin finish.

D. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

E. Back paint components where contact is made with building finishes to prevent electrolysis.

ACCESSORIES SCHEDULE

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Refer to drawings for full accessories schedule.

INSTALLATION

A. Comply with ADA and TAS requirements. Refer to Drawings. When not shown, submit supplier's recommendations for locations and mounting height before proceeding. Contractor shall be responsible for any relocation, including repair work, made necessary by relocation due to failure to comply with ADA and TAS requirements.

B. Contractor shall be responsible for supplying all opening, blocking, and other components necessary for installation of all toilet accessories.

C. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored.

D. Use approved theft-resistant type fasteners.

ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 28 13

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SECTION 10 44 00 – FIRE PROTECTION SPECIALTIES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUMMARY

A. Section Includes:
   1. Fire Extinguishers
   2. Cabinets

REFERENCES

A. NFPA 10 – Portable Fire Extinguishers

B. ADA Accessibility Guidelines

QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Provide fire extinguisher, cabinets and accessories by single manufacturer.

SUBMITTALS

A. Product Data:
   1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
   2. Manufacturer's installation instructions.

B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function.

PRODUCTS

ACCEPTABLE MANUFACTURERS

A. Specifications are based on the products of named manufacturers. Other listed manufacturers who produce products equivalent to those specified are approved for use on the Project. Other manufacturers must have a minimum of five (5) years experience manufacturing equivalent to those specified and comply with Division 1 requirements regarding substitutions to be considered.

   Portable Fire Extinguishers:
   Badger; Div of Figgie Fire Protection Systems. 1-800-446-3857 www.badgerfire.com
   General Fire Extinguisher Corporation. 800-323-6452 www.genfire.com
   J.L. Industries, Inc 1-00-554-6077 www.jlindustries.com
   Kidde: Walter Kidde, The Fire Extinguisher Co. www.kidde.com
   Larsen's Manufacturing Company. 800-527-7367 www.larsenmfg.com

MATERIALS

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A. Cold-Rolled Steel Sheet: Carbon steel, complying with ASTM A 366/A 366M, commercial quality, stretcher leveled, temper rolled.

PORTABLE FIRE EXTINGUISHERS

A. General: Provide fire extinguishers of type, size and capacity for each cabinet and other locations indicated.

B. Multipurpose Dry-Chemical Type: UL-rated 4-A:60B:C, 10-lb (4.5-kg) nominal capacity, in enameled steel container.

FIRE PROTECTION CABINETS

A. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.

B Fire Rated Cabinets: Listed and labeled to meet requirements of ASTM E 814 for fire-resistance rating of wall where it is installed.
Construct fire-rated cabinets with double walls fabricated from 0.0478-inch thick, cold rolled steel sheet lined with minimum 5/8-inch thick, fire-barrier material. Provide factory drilled mounting holes.
Cabinet Metal: Enameled-steel sheet.

C. Cabinet type: Suitable for the following:
Fire extinguisher: Cabinet for housing fire extinguisher.

D. Cabinet Mounting: Suitable for the following mounting conditions:
Semirecessed: Cabinet box partially recessed in walls of shallow depth to suit style of trim indicated.

E. Cabinet Trim Style: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.
Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backend).
Rolled-Edge Trim: 4-inch backbend depth.

F. Cabinet Trim Material: Manufacturer's standard as follows:
Same metal and finish as door.

G. Door Material: Manufacturer's standard as follows:
Sheet Steel

H. Door Glazing: Manufacturer's standard as follows:
Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, as follows:
Class 1 (clear)

I. Door Style: Manufcturer's standard as follows:
Fully glazed panel with frame.

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J. Door Construction: Fabricated doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
Provide minimum 1/2 inch thick door frames, fabricated with tubular stiles and rails, and hollow metal design.

K. Door Hardware: Provide manufacturer's standard door-oerating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.

ACCESSORIES

A. Mounting Brackets: Manufacturer's standard steel, designed to secure extinguisher, of sizes required for types and capacities of extinguishers indicated, with plated or baked-enamel finish.
Provide brackets for extinguishers not located in cabinets
Provide brackets for extinguishers located in cabinets.

B. Identification: Provide lettering to comply with authorities having jurisdiction for letter style, color, size, spacing, and location.
Identify bracket-mounted extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to wall surface.
Identify fire extinguisher in cabinet with the words "FIRE EXTINGUISHER" applied to door.
Application process: Vinyl Letters.
Lettering Color: White
Orientation: Vertical
Identify fire blanket in cabinet with the words "FIRE BLANKET" applied to door.
Application process: Vinyl Letters.
Lettering Color: White
Orientation: Vertical

EXECUTION

INSTALLATION

A. General: Install fire protection cabinets in locations or required by authorities having jurisdiction and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

C. Examine fire extinguishers for proper charging and tagging.
Remove and replace damaged, defective, or undercharged fire extinguishers.
Install fire extinguishers in compliance with requirements of authorities having jurisdiction.

ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

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C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures

END OF SECTION 10 44 00

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SECTION 10 75 00 – FLAGPOLES

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes: Requirements including but not limited to:
   1. Ground set flagpoles made from aluminum.
   2. Fittings, base, anchorage.
   3. Flags.
   4. Accessories necessary for a complete installation.

B. Related Sections include the following:

   1. Division 1 Section “Windstorm Rated Construction”.
   2. Division 3 Section "Cast-in-Place Concrete" for concrete footings for flagpoles.
   3. Division 7 Section "Joint Sealants" for elastomeric sealant filling the top of the foundation tube.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, currently licensed to practice within jurisdiction of the project location, with experience in the design of curtainwalls and aluminum storefronts to design ground set flagpoles using performance requirements and design criteria indicated.

B. Structural Performance: Flagpole assemblies, including anchorages and supports, shall withstand design loads indicated within limits and under conditions indicated.
   1. Wind Loads: Determine according to NAAMM FP 1001. Refer to the Structural Engineer’s Drawings for basic wind speed for Project location when flying two flags.
   2. Base flagpole design on polyester, nylon or cotton flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

1.3 SUBMITTALS

A. Product Data: Technical data for flagpoles including construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles.

B. Shop Drawings: Submit plans, elevations, and attachment details. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support, including section, and details of foundation system.

C. Delegated Design Submittal.

D. Operation and Maintenance Data: Submit data to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:

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1. Accessibility Requirements: Comply with applicable requirements.
   a. United States Access Board Americans with Disabilities Act Accessibility Guidelines (ADAAG) (2010 ADA Standards for Accessible Design).
   b. ICC A117.1 Accessible and Useable Building and Facilities.
   c. Texas Accessibility Standards (TAS) 2012 or United States Access Board Americans with Disabilities Act Accessibility Guidelines (ADAAG) (2010 ADA Standards for Accessible Design).

B. Source Limitations: Obtain flagpoles as complete units, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Acme/Lingo Flagpoles, LLC.
   2. Baartol Company.
   3. Carrot-Top Industries, Inc.
   4. Concord American Flagpole.
   5. Eder Flag Manufacturing Company, Inc.
   6. Ewing Flagpoles.
   7. Morgan-Francis Flagpoles and Accessories.
   8. Pole-Tech Company Inc.
   9. U.S. Flag & Flagpole Supply, LP.

2.2 ALUMINUM FLAGPOLES

A. Aluminum Flagpoles: Cone tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B 241/B 241M, Alloy 6063, with a minimum wall thickness of 3/16 inch (4.8 mm).

B. Exposed Height: 40 feet.

C. Construct flagpoles in one piece if possible. If more than one piece is necessary, comply with the following:
   1. Fabricate shop and field joints without using fasteners, screw collars, or lead calking.
   2. Provide flush hairline joints using self aligning, snug fitting, internal sleeves.

D. Metal Foundation Tube: Corrugated steel foundation tube, 0.060 inch (1.52 mm) wall thickness with 3/16 inch (4.8 mm) steel bottom plate and support plate; 3/4 inch (19 mm) diameter, steel ground spike; and steel centering wedges welded together. Galvanize foundation tube after assembly. Furnish loose hardwood wedges at top of foundation tube for plumbing pole.
   1. Flashing Collar: Same material and finish as flagpole.

E. Sleeve for Aluminum Flagpole: Fiberglass or PVC pipe foundation sleeve, made to fit flagpole,

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for casting into concrete foundation.
1. Flashing Collar: Same material and finish as flagpole.

F. Cast Metal Shoe Base: Made from aluminum with same finish and color as flagpoles for anchor bolt mounting; furnish with anchor bolts.
1. Furnish ground spike.

2.3 FITTINGS

A. Finial Ball: Flush seam ball, sized to match flagpole butt diameter.
1. 0.063 inch (1.6 mm) spun aluminum, finished to match flagpole.

B. Internal Halyard, Cam Cleat System: 5/16 inch (8 mm) diameter, braided polypropylene halyard; cam cleat; and concealed revolving truck assembly with plastic coated counterweight and sling. Furnish flush access door secured with cylinder lock. Finish truck assembly to match flagpole.
1. Halyard Flag Snaps: Chromium plated bronze or stainless steel or bronze or nylon swivel snap hooks with neoprene or vinyl covers. Furnish two per halyard.

2.4 MISCELLANEOUS MATERIALS

A. Flag: One (1) 6’ x 10’ US flag, and one (1) 6’ x 10’ Texas flag.

B. Concrete: Quick set concrete composed of not less than five (5) sacks of Portland cement conforming to ASTM C150, per cubic yard of wet concrete combined with fine aggregate, clean water, and mixed in proportions to attain minimum 28 day compressive strength of not less than 3,000 psi.

C. Nonshrink, Nonmetallic Grout: Factory packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M.

D. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.

E. Sand: ASTM C 33/C 33M, fine aggregate.

F. Elastomeric Joint Sealant: Single component nonsag urethane joint sealant complying with requirements in Section 07 90 00.

G. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.5 FINISH

A. Aluminum:
1. Natural Satin Finish: AA-M32, fine, directional, medium satin polish; buff complying with AA-M20; seal aluminum surfaces with clear, hard-coat wax.

PART 3 – EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

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B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.

D. Foundation Tube: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure.

E. Sleeves: Locate and secure sleeves in forms by bracing to reinforcement and forms.

F. Anchor Bolts: Locate and secure anchor bolts in forms with templates and by tying to reinforcement.

G. Concrete: Place concrete as specified in Section 03 30 00. Compact concrete in place by using vibrators. Moist cure exposed concrete for no fewer than seven days or use nonstaining curing compound.

H. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

A. Install flagpoles where indicated and according to Shop Drawings and manufacturer's written instructions.

B. Foundation Tube: Place flagpole in tube, seated on bottom plate between steel centering wedges, and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch (50-mm) layer of elastomeric joint sealant and cover with flashing collar.

C. Provide positive lightning ground.

3.3 CLEANING AND ADJUSTING

A. Clean area of debris and place excavated soil where directed or remove from site as directed. Clean flagpole of dirt and foreign matter which will affect appearance.

B. Touch up damage to finished surfaces with manufacturer’s matching paint.

C. Adjust fittings for smooth operation.

END OF SECTION 10 75 00

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SECTION 14 21 23 – MACHINE ROOM LESS ELECTRIC TRACTION PASSENGER ELEVATOR

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.01 SUMMARY

A. Section includes Machine room-less electric traction passenger elevators as shown and specified. Elevator work includes:
   1. Gearless electric traction passenger elevators.
   2. Elevator car enclosures, hoistway entrances and signal equipment.
   3. Operation and control systems.
   4. Accessibility provisions for physically disabled persons.
   5. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
   6. Materials and accessories as required to complete the elevator installation.

B. Related Sections:
   1. Division 1 General Requirements: Meet or exceed all referenced sustainability requirements.
   2. Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.
   3. Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.
   4. Division 5 Metals:
      a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
      b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
   5. Division 9 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
   6. Division 16 Sections:
      a. Providing electrical service to elevators, including fused disconnect switches where permitted. (Note: fused disconnect switch to be provided as part of elevator manufacture product)
      b. Emergency power supply, transfer switch and auxiliary contacts.
      c. Heat and smoke sensing devices.
      d. Convenience outlets and illumination in control room (if applicable), hoistway and pit.
   7. Division 22 Plumbing
      a. Sump pit
   8. Division 23 Heating, Ventilation and Air Conditioning
      a. Heating and ventilating hoistways and/or control room.

C. Work Not Included: General contractor shall provide the following in accordance with the requirements of the Model Building Code and ASME A17.1 Code. For specific rules, refer to ASME A17.1, Part 2 for traction elevators. State or local requirements must be used if more stringent. The cost of this work is not included in the TK Elevator’s proposal since it is a part of the building construction.
   1. A plumb and legal hoistway, properly framed and enclosed an including a pit of proper depth, and a pit ladder for each elevator. Hoistway walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2" at any point. Drains, lights, access doors, waterproofing and hoistway ventilation, as required.
   2. Elevator controller space
      a. Door jamb controller option - controller landing wall thickness must be a minimum of 8 1/2 inches thick. This is due to the controller being mounted on the top floor landing in the door

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frame on the return side of the door. For center opening doors, the controller is located on the right hand frame (from inside the elevator cab looking out). Provide telephone line, light fixture (200 lx / 19 fc), and convenience outlet in the hoistway at the landing where the elevator controller is located. Final location must be coordinated with elevator contractor. These requirements must be coordinated between the general contractor and the elevator contractor.

b. Control room option - provide a suitable control closet with access and ventilation in accordance with all applicable codes and regulations. The control closet shall be maintained at a temperature between 32 F (0 C) and 104 F (40 C). To be measured at 6 feet (1830 mm) above the floor and 1 foot (305 mm) out from the front center of the car controller(s). Relative humidity is not to exceed 95% non-condensing. Local codes may require tighter temperature ranges, and higher ventilation levels, please check with your local code authority for the exact requirements in your area. If your control closet temperatures exceed these requirements, contact your local TK Elevator sales representative for assistance. All telephone wiring to controller room control panel, and installation of telephone instrument or other communication equipment in elevator cab with all connections to elevator in controller room.

3. Hoistway must be maintained between 32ºF (0ºC) and 122ºF (50ºC) measured at the machine.
4. Adequate supports to carry the loads of all equipment, including overhead machine and machine beams located in hoistway including supports for guide rail brackets.
5. Complete 3 phase connections from the electric power mains to each controller, including necessary circuit breakers and fused mainline disconnect switches unless otherwise specified herein by elevator manufacture.
6. Electric power of the same characteristics as the permanent supply without charge for the construction, testing and adjusting.
7. Provide proper piping and conduit.
8. Divider beams for rail bracket support as required.
9. Cutting of walls floor, etc. and removal of such obstructions as may be necessary for proper installation of the elevator.
10. Grouting of door sills, hoistway frames, and signal fixtures after installation of the elevator equipment.
11. All painting, except as otherwise specified.
12. Provide hoistway walls designed and constructed in accordance with the required fire rating (including those places where elevator fixture boxes, rail bracket fastenings, and any other penetration into the hoistway walls).
13. Temporary enclosures, barricades and other protection from open hoistways and elevator work area during the time the elevator is being installed to meet all permanent installation safety codes. A temporary work platform to be provided at the top landing across the hoistway; if required, it should conform to all code and safety requirements.
14. Smoke detector /sensing devices and contacts wired to elevator control as required by local code. A means to automatically disconnect the main line power supply to the elevator prior to the application of water in the elevator controller room shall be furnished by the electrical contractor. This means shall not be self-resetting.
15. Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.
16. A standby power source, including necessary transfer switches and auxiliary contact, where elevator operation from an alternate power supply is required.
17. Adequate storage facilities for elevator equipment prior to and during installation at ground level within 150 feet of hoistway.
18. Setting of anchors and sleeves.

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19. Install bevel guards at 75° on all recesses, projections or setbacks over 2" (4" for A17.1 2000 areas) except for loading or unloading.
20. For car light and fan: provide a feeder and branch wiring circuits to elevator control cabinet.
21. Locate a light fixture (200 lx / 19 fc) and convenience outlet in pit with switch located adjacent to the access door.
22. Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42" minimum, (48" minimum for A17.1-2019 areas) shall be provided at the same height, above sill of access door or handgrips.

1.02 SUBMITTALS

A. Product data: When requested, the elevator contractor shall provide standard cab, entrance and signal fixture data to describe product for approval.

B. Shop drawings:
   1. Show equipment arrangement in the corridor, pit, and hoistway and/or optional control room. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
   2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
   3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
   4. Indicate electrical power requirements and branch circuit protection device recommendations.

C. Paint selection: Submit manufacturer’s standard selection charts for exposed finishes and materials.

D. Integrated laminate selection: Submit manufacturer’s standard selection charts for exposed finishes and materials.

E. Metal Finishes: Upon request, standard metal samples provided.

F. Operation and maintenance data. Include the following:
   1. Generic owner’s manuals and no wiring diagrams.
   2. Parts list, with recommended parts inventory.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: An approved manufacturer with minimum 15 years of experience in manufacturing, installing, and servicing elevators of the type required for the project.
   1. The manufacturer of machines, controllers, signal fixtures, door operators, cabs, entrances, and all other major parts of elevator operating equipment.
      a. The major parts of the elevator equipment shall be manufactured by the installing company, and not be an assembled system.
   2. The manufacturer shall have a documented, on-going quality assurance program.
   3. ISO-9001:2000 Manufacturer Certified
   4. ISO-14001:2004 Environmental Management System Certified
   5. LEED Gold certified elevator manufacturing facility.

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B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than 15 years of satisfactory experience installing elevators equal in character and performance to the project elevators.

C. Regulatory Requirements:
   1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
   2. NFPA 70 National Electrical Code.
   3. NFPA 80 Fire Doors and Windows.
   4. Americans with Disabilities Act - Accessibility Guidelines (ADAAG)
   5. Section 407 in ICC A117.1, when required by local authorities
   6. CAN/CSA C22.1 Canadian Electrical Code
   7. CAN/CSA B44 Safety Code for Elevators and Escalators.

D. Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(b), and NFPA Standard 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).

E. Inspection and testing:
   1. Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
   2. Arrange for inspections and make required tests.
   3. Deliver to the Owner upon completion and acceptance of elevator work.

F. Sustainable Product Qualifications:
   1. Environmental Product Declaration:
      a. GOOD: If Product Category Rules (PCR) are not available, produce a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate sThe main car control in each car shall contain the devices required for specific operation mounted in a surface-mounted panel requiring no applied faceplate. COP shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED?s shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided. Visual highlight is the standard equipped, integrated multimedia display.e.
      b. BEST: If Product Category Rules (PCR) are available, produce and publish an Environmental Product Declaration (EPD) based on a critically reviewed life-cycle assessment conforming to ISO 14044, with external verification recognized by the EPD program operator.
   2. Material Transparency:
      a. GOOD: Provide Health Product Declaration at any level
      b. BETTER: Provide Health Product Declaration (HPD v2 or later). Complete, published declaration with full disclosure of known hazards, prepared using the Health Product Declaration Collaborative's "HPD builder" on-line tool.
      c. BEST: Cradle to Cradle Material Health Certificate v3, Bronze level or higher.
   3. LEED v4 – Provide documentation for all Building Product Disclosure AND Optimization credits in LEED v4 for product specified.

1.04 DELIVERY, STORAGE AND HANDLING

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A. Manufacturing shall deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

1.05 PROJECT CONDITIONS

A. Temporary Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

1.06 WARRANTY

A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months after final acceptance.

1.07 MAINTENANCE

A. Furnish maintenance and call back service for a period of 12 months for each elevator after completion of installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours excluding callbacks.
   1. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation. Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours.
   2. Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts. Parts shall be produced by manufacturer of original equipment.
   3. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer: Design based around TK Elevator’s EOX Self-Supported Machine Room-Less elevator.

2.02 MATERIALS, GENERAL

B. All Elevator Cab materials including frame, buttons, lighting, wall and ceiling assembly, laminates and carpet shall have an EPD and an HPD.

C. Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.

D. Steel:
   1. Shapes and bars: Carbon.
   2. Sheet: Cold- and hot-rolled stainless steel sheet, galvanized.
   3. Finish: Factory-applied paint for structural parts, painted for architectural parts. Color selection must be based on elevator manufacture’s standard selections.

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E. Integrated laminate: Decorative surface finishes, pressure sensitive, acrylic type, nominal 0.014" thickness. Laminate selection must be based on elevator manufacture's standard selections.

F. Flooring by others.

2.03 HOISTWAY EQUIPMENT

A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and riveted/clinched. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.

B. Deflector Sheaves: None

C. Guide Rails: Dry, non-lubricated steel, fastened to the building with steel brackets.

D. Guides: Slide guides shall be mounted on top and bottom of the car.

E. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Predefined buffer stands for 4' and 5' pit depths.

F. Machine: The hoisting machine shall be a compact energy efficient permanent magnet Gearless traction type, consisting of PMAC motor, brake and driving sheave mounted on a rigid bedplate in the top of the hoistway. A large solid, forged shaft shall serve as a support for the motor rotor assembly and for the drive sheave and brake system. It shall be supported by roller bearings mounted in the machine housing.

G. Drive System:
   1. The drive system shall be of the Variable Voltage Variable Frequency (VVVF) regenerative.
   2. The system shall be a vector controlled pulse-width modulated AC drive. The variable voltage variable frequency drive shall convert the AC power supply using a two-step process to a variable voltage variable frequency power supply for use by the hoist motor.
   3. The speed control shall be by means of vector control providing direct torque and field excitation automatically provided by permanent magnet. A digital absolute velocity encoder shall be provided giving feedback to the controller on armature position and motor speed.
   4. Dual solid state electronics (IGBT Insulated Gate Bipolar Transistor) in series shall be used in place of mechanical contactors.

H. Motor/Machine: The motor shall be PMAC, totally enclosed, non-ventilated with class "F" insulation. The motor armature shall be dynamically balanced and supported by roller bearings of ample capacity. The armature and driving sheave shall be properly balanced for smooth, high-speed elevator performance. The PM machine shall be mounted horizontally in the top of the hoistway in a unitized formed steel structure on bearing plates furnished by the elevator installer. The unitized formed steel structure shall be securely fastened to the supports supplied by other trades.

I. Brake: The brake shall be a spring applied electric brake; held open by an electro-magnet actuated by a digital brake controller and designed to make smooth, positive stops. The Brake shall be designed to automatically apply in the event of interruption of power supply from any cause. Operation and control of the brake shall be all digital. The setting and lifting of the brake shall be software based and all electronic. All adjustments and setup of the brake shall be made using a PC interface. No contactors or resistors shall be used in the actuation of the brake.

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J. Suspension Belts and Governor Rope: Suspension belts shall be flat belts of polyurethane with an inner core of 14 steel cords with an FT1 fire rating such that hoistway sprinklers are not required by NFPA-13. Each belt shall have a suspension strength of 64 KN (14,388 pounds) for 150 and 200 fpm car speed. Suspension strength increases to 80 KN (17,985 pounds) for 350 fpm car speed.
   1. Three belts.
   2. Suspension tension monitor shall detect differences in belt tension and for loss of tension. If fault is detected, the car shall stop at the nearest floor and an Out of Service call be registered.
   3. Trip criteria shall be monitored, and data shall be stored in redundant non-volatile locations. Belts shall be replaced prior to the end of service life. Messages shall be issued at 180, 90, and 30 days prior to the last day of service life.
   4. Governor ropes shall be of steel wire construction.
   5. Any special tools, devices, software or equipment required for monitoring the wear of suspension shall be included with the installation of the equipment and become the property of the owner at time of elevator completion. This includes special ongoing monitoring systems, special tools and instruction needed to monitor the suspension system.

K. Counterweight: Counterbalance each elevator for smooth and economical operation by using steel and/or cement weights securely fastened in a steel counterweight frame. Counterweight shall equal the weight of the complete elevator car and approximately 50 percent of the specified capacity load.

L. Safety and Governor: Car safety shall be mounted on the bottom members of the car frame and be operated by a centrifugal speed governor. The governor shall be designed to cut off power to the motor and apply the brake whenever the governor indicates the car has excessive speed. The governor shall function when the car over speeds.

M. Emergency Terminal Limits: Place electric limit devices in the hoistway near the terminal landings. Limit switch(es) shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.

N. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the floor landings and correct for over travel or under travel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

2.04 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.
   1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates (where required), sight guards, and necessary hardware.
   2. Hoistway design: Entrance jamb has a fixed depth so provisions must be made to finish the edge of the wall that may not be covered by the entrance.
   3. Communication failure indicator: A Communication failure is a jewel that is located in the jamb and lights up if the connection with the phone in the elevator becomes faulty. Communication failure is tested on the SIL3 rated devices by inspectors to ensure the car will not run or accept a car call when there is a loss of communication between the car and controller.
   4. Main landing door & frame finish: Stainless steel door panels, no. 4 brushed finish with no. 4 brushed finish entrance frame.
   5. Typical door & frame finish: Stainless steel door panels, no. 4 brushed finish with same entrance frame finish.

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B. Interlocks: Equip each hoistway entrance with an approved type of interlock, tested as required by code. Provide door restriction devices as required by code.

C. Door Hanger and Tracks: Provide sheave type two-point suspension hangers and tracks for each hoistway horizontal sliding door.
   1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
   2. Hangers: Provide an adjustable device beneath the track to limit the up thrust of the doors during operation.
   3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

D. Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

2.05 PASSENGER ELEVATOR CAR ENCLOSURE

A. Car Enclosure:
   1. Walls: Cab type, stainless steel.Wall panels shall be constructed of steel with integrated laminate panels. Columns shall be stainless steel.
   2. Canopy: Galvanized steel with chain rope exit.
   3. Ceiling: Stainless steel downlight type, metal pans with suspended LED downlights. Number of downlights shall be dependent on platform size with a minimum of four. The metal pans shall be finished with a stainless steel, no. 4 brushed finish.
   4. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
   5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
      a. Door Finish: Stainless steel.
      b. Cab Sills: Extruded, aluminum mill finish.
   6. Handrail: Provide 1.5" (38 mm) diameter formed cylindrical metal bar on side and/or rear walls on front opening cars and side walls only on front and rear opening cars. Support rails shall have a stainless steel, no. 4 brushed finish.
   7. Ventilation: Manufacturer’s standard exhaust fan, mounted on the car top.
   8. Protection pads: Provide one set of vinyl protection pads.

B. Car Top Inspection: Provide a car top inspection station with an “Auto-Inspection” switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station shall give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

2.06 DOOR OPERATION

A. Door Operation: Provide a direct or alternating current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. The door control system shall be digital closed loop and the closed loop circuit shall give constant feedback on the position and velocity of the elevator door. The motor torque shall be constantly adjusted to maintain the correct door speed based on its position and load. All adjustments and setup shall be through the computer based service tool. Door movements shall follow a field programmable speed pattern with smooth acceleration and deceleration at the ends of travel. The mechanical door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when

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the car is dispatched to another landing. AC controlled units with oil checks, or other deviations are not acceptable.

1. No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.
2. Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
3. Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel shall reverse and the door shall reopen to answer the other call.
4. Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer shall sound. When the obstruction is removed, the door shall begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors shall stop and resume closing only after the obstruction has been removed.
5. Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors shall reverse and reopen. After the obstruction is cleared, the doors shall begin to close.
6. Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors shall recycle closed then attempt to open six times to try and correct the fault.
7. Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors shall recycle open then attempt to close six times to try and correct the fault.
8. Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

B. Door Protection Device: Provide a door protection system using microprocessor controlled infra-red light beams supporting 2D or 3D light curtains per code. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

2.07 CAR OPERATING STATION

A. Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in a surface-mounted panel requiring no applied faceplate. COP shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED’s shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided. Visual highlight is the standard equipped, integrated multimedia display.

B. Emergency Communications System: Integral phone system provided. For improved accessibility, there are visual and acoustic confirmation for button inputs as well as a voice synthesizer for travel and floor announcements.

C. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate, and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

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D. Special Equipment: Not Applicable

E. Digital Services: Cloud-based IoT monitoring system comes standard with these options:

ADA Phone - Code Compliant Cellular Connectivity

F. Digitally Native: Digital expansion for evolving ecosystem of digitally augmented services. DEP infotainment display comes standard.

2.08 CONTROL SYSTEMS

A. Controller: The elevator control system shall be microprocessor based and software oriented. The system shall operate in real time, continuously analyzing the car(s) changing position, condition, and work load. All controller and operational circuits including the brake control and drive system shall be digital. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.
   1. Momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered.
   2. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "up" hall buttons have been pressed. The car shall not stop at floors where "down" buttons have been pressed, unless the stop for that floor has been registered by a car button or unless the down call is at the highest floor for which any buttons have been pressed. Pressing the "up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button or unless the up call is the lowest for which any button has been pressed.
   3. When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction. If both up and down calls are registered at an intermediate floor, only the call corresponding to the direction of car travel shall be canceled upon the stopping of the car at the landing.
   4. A car that is stopping for the last hall call in the preference direction, and that hall call is for the opposite direction with no onward car calls, shall reverse preference when the selector position advances to the landing at which the car is committed to stop. A car that is stopping for the last hall call in the preference direction, and that hall call is for the same direction, shall hold its preference until the door is almost closed allowing time for a passenger to register an onward car call which shall maintain the preference. If no car call is registered before the door is almost closed, the car shall lose its preference and shall be available to accept calls in either direction.

B. Operation: Selective Collective – ETA based. The system is optimized to get a car to the floor where a hall call has been registered, in the shortest time. The system receives input information from standard call pushbuttons located in the hall, car position and car load information from individual car loadweighers.
   1. When group operation is required, the group supervisory operation shall be embedded within selected car controllers. No separate group controller shall be supplied. The microprocessor shall constantly scan the system for hall calls. When hall calls are registered, the control system shall immediately calculate the estimated time for arrival using such information as, number of floors to travel from the current position, the time it takes to travel one floor at top speed, calls assigned to a car, and car reversal time to respond to a call in the opposite direction of travel.

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When a car's status changes or additional hall calls are registered, the estimated time of arrival shall be recalculated and calls reassigned if necessary.

2. Traffic Pattern: The microprocessor shall provide flexibility to meet well defined patterns of traffic, including up peak, down peak, and heavy interfloor demands, and adjust for indeterminate variations in these patterns which occur in buildings.
3. Artificial Intelligence: Artificial Intelligence shall be an integral part of the group control system software. The enhanced artificial intelligence shall optimize the interfloor traffic performance. Inputs for the artificial intelligence shall include accurate passenger load from an electronic loadweigher, probable car calls generated from each hall call, type of building and observed traffic patterns.

C. Load Weighing Device: Provide a load weighing device on each car which, when the particular car is filled to an adjustable percentage of the capacity load, shall cause the car to bypass landing calls but not car calls. The passed landing calls shall remain registered for the next following car.
   1. The device shall be unaffected by the action of compensating chain or rope. The device shall detect a 50-pound (23 Kg.) load change under all conditions.
   2. The load sensor shall use a load cell to accurately measure the weight in the car. The information shall be transferred via a serial link to the elevator controller.

D. Anti-Nuisance Call Control: The microprocessor control system shall evaluate the number of people on the car and compare that value to the number of car calls registered. If the number of car calls exceeds the number of people by a field programmable value, the car calls shall be canceled after the first call has been answered.

E. Position Selector: The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a primary position encoder. The microprocessor control system shall store the floor position and slow down points in memory.

F. Motion Control: The drive control system shall be dual-loop feedback system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system producing extremely smooth and accurate stops. The velocity encoder shall permit continuous comparison of machine speed to velocity profile and to actual car speed. This accurate position/velocity feedback shall permit a fast and accurate control of acceleration and retardation.

G. Motor Pre-Torque: Current shall be applied to the elevator drive before the brake is released and the speed pattern is dictated to eliminate roll back and sling shot effects of unbalanced loads in the car. The electronic loadweigher shall determine the load on the car determining a pre-torque reference to send to the drive.

H. Emergency Power Operation: (10-DOA) Upon loss of the normal power supply, building-supplied standby power is available on the same wires as the normal power supply. Once the loss of normal power is detected and standby power is available, the elevator is lowered to a pre-designated landing and the doors are opened. After passengers have exited the elevator, the doors are closed and the car is shut down. When normal power is restored, the elevator automatically resumes operation.

I. Automatic Light and Fan shut down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.

J. Special Operation: Not Applicable

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K. Digital Services:

Cloud-based IoT Monitoring System (standard): Contractor shall provide a cloud-based IoT (internet of things) monitoring system capable of tracking door movements and timing, trips, power cycles, car calls, out-of-service events and modes. This observation will continue 24/7 and it shall be capable of providing service technicians a minimum of three recommended solutions for defined failure events and automatically dispatch service technicians in the event of failure(s) while sending notifications to end users of changes in their equipment's state via both email and mobile device. Access to IoT and related equipment data and status will be made available in both a web portal and mobile application secured by password and username with at least two-factor authentication. Finally, this system must be self-contained and not require internet provision by others.
Along with the monitoring system, options are available.

ADA Phone – Code Compliant Cellular Connectivity: Contractor shall provide a phone service through a self-contained cellular based VoIP system. This system shall meet code, include a backup battery capable of powering the emergency communication equipment for 4+ hours in the event of a power outage. The solution shall have remote monitoring capability to ensure continuous connectivity with a means of remote troubleshooting. Remote monitoring capability shall include, at a minimum, the ability to monitor connectivity and power supply. Remote monitoring shall be capable of providing local alerts to response personnel when on-site intervention is required.

L. Digitally Native:

EOX has all the components needed for digital expansion from day one. No additional technician dispatching. On-site installation or modernization is required to enable new digital services giving you confidence that your elevator will remain up-to-date for years to come. It is born digital, connected to TK Elevator's evolving ecosystem of digitally augmented services.

2.09 HALL STATIONS

A. Hall Stations, General: Buttons shall illuminate to indicate call has been registered at that floor for the indicated direction.
   1. Provide one pushbutton riser with faceplates having a brushed stainless steel finish, surface-mounted in the entrance jamb.
      a. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the entrance frame at the designated level.

B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

C. Combo Hall Lantern and Position Indicator: An electronic position indicator shall be provided and mounted for optimal viewing. As the car travels, its position in the hoistway shall be indicated by the illumination of the alphanumeric character corresponding to the landing which the elevator is stopped or passing. Hall lantern is combined in the display with the directional arrow to indicate the travel direction in the same faceplate. Faceplates shall match the hall stations.

D. Special Equipment: Not Applicable

2.10 CONTROLLER LOCATION

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A. Location: Door Jamb Mount is integrated with controller in the door jamb. Control power and cab light are provided by the elevator contractor and included with the integrated assembly. Main power disconnect is provided by others.

PART 3 EXECUTION

3.01 EXAMINATION

A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and/or control room, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

3.02 INSTALLATION

A. Install elevator systems components and coordinate installation of hoistway wall construction.
   1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
   2. Comply with the National Electrical Code for electrical work required during installation.

B. Perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.

C. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.

D. Welded construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualification of welding operators.

E. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.

F. Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.

G. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.

H. Erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascia and toe guards after rough walls finished. Set sill units accurately aligned and slightly above finish floor at landings.

I. Lubricate operating parts of system, including ropes, as recommended by the manufacturer.

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3.03 FIELD QUALITY CONTROL

A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required and recommended by Code and governing regulations or agencies. Perform other tests, if any, as required by governing regulations or agencies.

B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

3.04 ADJUSTING

A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

3.05 CLEANING

A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; it shall not be cleaned with bleach-based cleansers.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.
   1. Use environmentally preferable and low VOC emitting cleaners for each application type. Cleaners that contain solvents, pine and/or citrus oils are not permitted.

3.06 PROTECTION

A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.07 DEMONSTRATION

A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.

B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

3.08 ELEVATOR SCHEDULE

A. Elevator Qty. 1
   1. Elevator Model: EOX
   2. Elevator Type: Gearless Traction Machine Room-Less, Passenger
   3. Rated Capacity: 2500 lbs.

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4. Rated Speed: 200 ft./min.
5. Operation System: EOX controller
6. Travel: 43'-3"
7. Landings: 2 total
8. Openings:
   a. Front: 1
   b. Rear: 0
9. Clear Car Inside: 6'-8" wide x 4'-3 1/2" deep
10. Inside clear height: 7'-4" standard
11. Door clear height: 7'-0" standard
12. Hoistway Entrance Size: 3'-6" wide x 7'-0" high
13. Door Type: One-speed Center opening
14. Power Characteristics: 460 volts, 3 Phase, 60 Hz.
    a. Note: Isolation Transformer required for jobs with less than 460vac as well as 575vac and greater, 3 Phase building power. With exception of the 150 fpm speed cars for 208vac, which do not require an isolation transformer.
15. Seismic Requirements: No
16. Hoistway Dimensions: 8'-7" wide x 6'-4 7/8" deep
    a. Note: Hoistway dimensions listed above are for Non-Seismic areas only. If you have chosen the option for seismic requirements, please consult your local TK Elevator Sales Representative for the proper hoistway dimensions.
17. Pit Depth: 5'-0"
18. Button & Fixture Style: EOX Signal Fixtures
19. Special Operations: None
20. Digital Services: ADA Phone - Code Compliant Cellular Connectivity
21. Digitally Native

END OF SECTION 14 21 23

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STRIDDE, CALLINS & ASSOCIATES, INC.
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SECTION 20 00 00 - MECHANICAL AND ELECTRICAL SPECIFICATIONS (COMMON CONDITIONS)

1.1 GENERAL CONDITIONS

A. Sections of the Specifications covering general and supplemental conditions are a part of the contract and Contractors shall observe all of the requirements thereof, insofar as they pertain and are applicable to their respective work. Reference to Contractor or Contractors shall imply Mechanical (Plumbing and HVAC) and Electrical Contractors.

B. Contractors shall examine all Drawings and Specifications, visit the site of the proposed construction, become fully informed as to the extent and character of the work required, and make provisions for same in his bid. It will be assumed that the Contractor in submitting his bid has visited the premises and his bid covers all work necessary to properly install his work.

C. If any requirements of the Drawings and the Specifications appear to be difficult to perform, or if there is a question regarding performance, Contractor shall report same to the Architect during the bidding period. The right to make any reasonable change in the location of outlets, apparatus, and equipment up to the time of rough-in is reserved by the Architect without involving any additional expense.

D. If any discrepancies occur during construction between work being performed by the Contractor and work of other trades, it shall be the responsibility of the Contractor to notify the Architect immediately. Under no circumstances shall the Contractor proceed with any work conflicting with other trades until such time as the discrepancies have been corrected. In cases where interference develops, Architect shall decide which work is to be relocated regardless of which was first installed.

E. Contractor shall proceed with his work so as to conform to the progress of the work of other trades and not delay the project. Contractor shall complete all installations as soon as the conditions of the project will permit.

1.2 SCOPE OF WORK

A. Work to be done under this contract shall include the furnishing of all labor, materials, apparatus, and connections to complete, in finished operating condition, the work for Stadium Improvements, Calallen Independent School District, Corpus Christi, Texas.

B. Contractor shall take into account that deviations from routing and layout of new work indicated on the Drawings may be required to avoid interference with existing structure and facilities. Contractor shall be responsible for rerouting of existing conduit, piping, etc., to avoid interference with new work if deviations in routing of new work cannot be made to avoid interference with existing conditions. Wiring, piping, ductwork, etc., which serves loads or areas to remain in use either temporarily or permanently will be rerouted as required and as directed to preserve continuity of service.

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C. All items of labor, material, or equipment not required in detail by the Specifications or Drawings, but incidental to, or necessary for the complete installation and proper operation of all phases of work described herein, or reasonably implied in connection therewith, shall be furnished as if called for in detail by the Specifications or Drawings.

D. Existing underground utilities are not indicated on the Drawings. The Contractor shall be responsible for jobsite locating and protecting all existing underground utilities prior to trenching or pier drilling.

1.3 WORKMANSHIP

A. All labor shall be performed in the best and most workmanlike manner by mechanics skilled in their particular trades. All installations shall be complete in both effectiveness and appearance whether finally enclosed or left exposed. Architect reserves the right to direct the removal or replacement of any item which in his opinion shall not present a reasonable neat or workmanlike appearance, providing that same can be properly installed in an orderly way by usual method for such work. All specialties and appurtenances shall be installed to conform to the manufacturer's recommendations unless otherwise specified.

1.4 CODES, PERMITS, AND FEES

A. Entire installation shall be done in strict accordance with all local, state, and federal ordinances, codes, and regulations.

B. In the event there is a conflict between the Drawings and Specifications and the applicable codes, ordinances, and regulations, the codes, ordinances, and regulations requirements shall govern. However, if the contract requirements are in excess of these requirements and do not conflict with the requirements, the contract provisions shall govern. If any work indicated on the Drawings is in conflict with codes, ordinances and regulations, Contractor shall advise Architect at least one (1) week prior to bid date so that discrepancies may be corrected by an addendum to the Drawings and Specifications. Failure by the Contractor to advise of any discrepancies shall leave the Contractor fully and completely responsible for compliance with all applicable codes and requirements.

C. All work shall comply with Standards contained in applicable NFPA pamphlets, all as published by the NFPA (National Fire Protection Association).

D. Contractor shall obtain all permits and pay all fees necessary in connection with his work.

1.5 SAFETY STANDARDS

A. It shall be Contractor's sole responsibility to initiate, maintain, and supervise all safety precautions required by local, state, and federal laws, including OSHA (Occupational Health and Safety Administration) and trench safety laws.

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1.6 MATERIALS AND EQUIPMENT

A. All materials and equipment furnished under this contract shall be in strict accordance with these Specifications, and shall be new. Equipment shall be of the latest or current products available. When two (2) or more articles of the same materials or equipment are required, the articles of each kind shall be standard products of a single reputable manufacturer. Electrical materials and equipment shall bear the label of UL (Underwriters Laboratories, Inc.).

B. All materials and equipment shall be clearly marked, stamped, or labeled for identification. Identification marks or labels shall be plainly visible for inspection and shall not be obscured or obliterated in any manner. Painting or covering shall not be done until so ordered by the Architect.

C. Contractor shall furnish to the Architect, within a reasonable time after award of contract, and prior to commencing any work, complete brochures of all materials and equipment which the Contractor proposes to furnish on the project. Data shall include descriptive literature, performance data, diagrams, capacity information, etc., to substantiate that proposed equipment physical size and capacity will meet all of the requirements of the Drawings and Specifications.

D. All data must be checked and any required changes indicated thereon by the Contractor, signed, and dated prior to furnishing same to the Architect for approval. Contractor's attention is directed that it is mandatory that he thoroughly review data prior to furnishing same to assure that equipment is in accordance with Drawings and Specifications and to assure prompt return of the data.

E. Each brochure shall be neatly organized into a single binder or electronic PDF file. In each brochure provide cover sheet identifying project name and location, Architect, Engineer, General Contractor, and Mechanical, Electrical, or Plumbing Contractor. Include Contractor's addresses and phone numbers. Provide adequate space for Architect's and Engineer's stamps. Provide quantity of submittal copies required by other sections of the Specifications. Refer to other sections of the Specifications for additional requirements.

F. If above information is not provided complete as specified above and within the allocated time, all equipment shall be furnished exactly as specified without any substitutions.

G. In furnishing data of proposed equipment and materials, Contractor must, in writing, specifically call to the attention of the Architect every deviation from the Contract Drawings and Specifications. Any and all substitution requests shall follow the Architectural Specification requirements such as substitution requests, substitution forms, etc. The contractors shall submit examples of substitution products if so directed by the Owner, Architect or Engineer at their expense.

H. Review of data, drawings, etc., shall not be construed as releasing the Contractor from further responsibility, but rather as a means to coordinate the work and to aid in the proper selection and installation of the equipment. All material and equipment shall be subject to final acceptance by the Architect at the completion of the project.

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1.7 WARRANTY

A. Any defects from defective or improper materials or faults arising from improper workmanship which may appear within a period of twelve (12) months from the date of final acceptance of the building shall be amended and made good by the Contractor at his own cost. Architect shall furnish to the Contractor a letter indicating the date of final acceptance.

B. Where such defective work results in damage to the work installed under other sections of the Specifications, all such work shall be restored to its original condition at the expense of the Contractor by parties skilled in the particular work required.

1.8 DRAWINGS

A. These Specifications are accompanied by Drawings indicating typical layouts, pipe, conduit sizes, outlet and equipment locations, etc. Drawings and these Specifications are complementary each to the other and what is called for by one shall be as binding as if called for by both. All electrical outlets indicated on the Drawings are schematic. Exact location of each outlet shall be based upon exact architectural dimensions and related mechanical details.

B. Drawings as prepared are in general diagrammatic. Contractor shall carefully lay out his work at the site to conform to existing conditions, architectural, structural, mechanical, and electrical conditions, to avoid all obstructions and to conform to details of installation as indicated on the Drawings and supplied by the manufacturers of the equipment to be installed and thereby to provide an integrated, satisfactorily operating installation. All necessary offsets in piping, fittings, etc., required to avoid interferences between piping, equipment, architectural, and structural shall be furnished and installed by the Contractor without additional expense to the Owner or Architect.

C. Routing paths for all piping, power feeders, and branch circuits are not indicated on the Drawings. Routing paths which are indicated are schematic and are not accompanied by dimensional data or detailed for every required offset. Contractor shall coordinate proposed routing paths for piping power feeders, and branch circuits with the General Contractor / Architect / Engineer prior to installing any such piping or conduit raceways. All piping, conductors, conduit, boxes, fittings and supports required to install piping and raceways indicated within the Construction Drawings and Technical Specifications are hereby included in the project requirements and shall be included in the proposal submitted by the Contractor.

D. These Specifications and Drawings accompanying same are intended to cover systems which will not interfere with new building conditions, which will fit into the available spaces, and which will ensure complete and satisfactory systems. Contractor shall, therefore, carefully examine the Drawings and the building and shall be responsible for the proper fitting of his material and apparatus into the building.

E. Contractor's attention is directed that all equipment he proposes to furnish must fit into the space allocated for same on the Drawings. It shall be the Contractor's responsibility to furnish data to evident that sufficient space can be provided for the installation of proposed equipment and that adequate access will exist for service and maintenance of

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equipment. Should changes become necessary during construction, the Contractor shall make such necessary changes at his (the Contractor's) own expense.

1.9 CHANGES

A. Any changes from the Drawings necessary to make the installation conform to building construction, to make this work fit the work of other trades, or to make this work conform to the rules of the city and municipal bodies having jurisdiction shall be made by the Contractor at his (the Contractor's) own expense.

1.10 PROTECTION

A. All work, equipment, and materials shall be protected at all times to prevent damage or breakage either in transit, storage, installation, or testing. All openings shall be closed with caps or plugs during installation. All material and equipment shall be covered and protected against dirt, water, chemicals, or mechanical injury. Failure on the part of the Contractor to provide adequate protection will be cause for rejection of the unprotected equipment and materials.

1.11 CUTTING AND PATCHING

A. Where existing surfaces are disturbed, cut, or damaged and these surfaces are exposed to view in finished areas, Contractor shall replace same with materials and finish matching existing surfaces. All patches, etc., shall thoroughly bond with the original surfaces and shall be level with same. Cutting and patching of existing surfaces shall be done by parties skilled in that particular work. All openings around conduits or piping through floors or walls shall be grouted and sealed.

B. Work shall be carefully laid out in advance and the exact size and locations of openings required shall be furnished to the General Contractor. Contractor shall be responsible for the furnishing and setting for the proper and permanent location of all sleeves, hangers, supports, inserts, plates, etc. If any cutting of the construction is necessary because of erroneous locations or to patch openings not used, the work shall be done at the expense of the Contractor by parties skilled in that particular work. No cutting or core drilling shall be done without permission of the Architect. All drilling and patching for expansion bolts, hangers, and other supports shall be done by the Contractor, subject to the approval of the Architect.

C. Contractor’s attention is directed that existing roofs are bonded roofs and warranty of work cannot be disrupted. Cutting and patching of roofs, mopping new equipment and pipe supports into existing roof, cutting new **duct** penetrations through roof, and flashing/sealing roof curbs into existing roof shall be done in accordance with instructions, method, etc., of a roofing Contractor approved by the Owner.

1.12 EXCAVATION AND BACKFILL

A. Each Contractor shall provide all necessary excavation and backfilling required for his work. Excavation shall be backfilled with approved material tamped and puddled compactly in place to a density required to leave surface of ground at original level without settlement.

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1.13 SLEEVES

A. All piping (except uninsulated copper piping) and conduits which pass through new floors and exterior walls shall be provided with pipe sleeves. Copper pipe sleeves shall be used for uninsulated copper piping.

B. Sleeves must be secured in place and plumb. Sleeves must be of sufficient size so as to allow approximately 1/4" space between the sleeve and the pipe or, if the pipe is insulated, 1/4" space between the sleeve and the insulation.

C. All piping and conduit passing through the floors or exterior walls shall have the space between the sleeve and the pipe or conduit packed and caulked watertight and rodent proof.

1.14 CERTIFICATION OF INSTALLATION BY EQUIPMENT MANUFACTURER'S REPRESENTATIVE

A. In order to place responsibility for the furnishing of the proper equipment and to see that it is installed as intended by the manufacturer, the Contractor, during construction, shall request supervisory assistance from the equipment manufacturer's representatives so that the material installation will be properly installed. After installation, the Contractor shall again request the representatives to inspect and certify that the equipment is in proper working order.

B. Before final payment is issued, the representatives shall submit to the Architect, through the Contractor, a signed statement certifying to their inspection and that the equipment is properly installed and ready for operation.

1.15 ESCUTCHEONS

A. Where exposed pipes pass through floors, walls, or ceilings, they shall be fitted with chromium plated stainless steel escutcheons firmly secured to the pipes and held in place with set screws.

1.16 FIRE PROTECTION/SOUND ATTENUATION SEALANT

A. All pipe, conduit, etc., penetrations through fire separation walls, partitions, floors, etc., shall be sealed with firestop sealant or foam system. Firestop sealant or foam shall be UL classified for the application, shall have intumescent characteristics, and shall be listed (1 hour, 2 hour, 4 hour) to match the rating of surface penetrated.

B. All pipe, conduit, etc., penetrations through walls, partitions, floors, etc., which are not fire rated but are intended to attenuate sound shall be sealed with expandable foam or other material to provide sound barrier.

1.17 DEMOLITION AND WORK WITHIN EXISTING BUILDING

A. In the preparation of these documents, effort has been made to show the approximate locations of, and connections to the existing piping, duct, equipment and other apparatus related to this phase of the work. However, the Contractor shall be responsible for verifying existing conditions which are associated with new work. Contractor shall visit

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the site to inspect the facilities and related areas. Contractor shall inspect and verify all details and requirements of all the contract documents, prior to submittal of proposal. All discrepancies between the contract documents and existing conditions shall be reported to the Architect during the bidding period.

B. Conduit, power and control wiring, pipe, duct, equipment and controls serving mechanical, plumbing, electrical, Owner's equipment, etc., which is to remain but which is served by conduit, pipe, duct, equipment, and controls that are disturbed by the remodeling work, shall be reconnected in such a manner as to leave this equipment in proper operating condition.

1.18 CONTINUITY OF SERVICE

A. At no time during the progress of the work shall the Contractor interrupt the continuity of any of the required services to campus buildings and facilities during regular scheduled usage by Owner. It shall be the responsibility of the Contractor to take the necessary precautions and to plan the sequence of his work so that this may be accomplished.

B. Where service interruptions of campus buildings and/or facilities are required, the Contractor shall arrange a minimum of one week in advance by written notice to the Owner for the service interruption and shall submit for approval, a proposal indicating the extent of time of the interruption and the service or facilities that will be interrupted. Final time which will be scheduled will be that approved by the Owner.

1.19 REMOVED MATERIALS, FIXTURES, AND EQUIPMENT

A. Certain existing materials, fixtures, devices, and equipment are to be removed. Fixtures, devices and equipment which are selected by the Owner shall remain the property of the Owner. Such fixtures, devices and equipment shall be delivered by the Contractor to a designated location at the site of construction. Contractor shall exercise extreme care in removing any fixtures, devices, and equipment to be retained by the Owner.

B. Fixtures, devices, and equipment which are not selected by the Owner shall become the property of the Contractor. Such devices, fixtures, and equipment shall be removed from the premises by the Contractor. Contractor shall exercise extreme care in removing any fixtures, devices and equipment to be retained by the Owner.

1.20 CLEANING

A. Contractor shall thoroughly clean all equipment, materials, and devices furnished and set by him. Contractor shall remove all of his debris that may have accumulated during the job. After the Architect inspects the equipment, any discrepancies shall be amended as directed.

1.21 USE OF ENGINEERS ELECTRONIC DRAWINGS

A. The Contractor may request the use of electronic copies of the Engineers Drawings for preparation of Contractor shop drawings. All such requests must be presented to the prime design firm. Upon receipt by the Engineer of the executed Engineer’s standard Waiver of Indemnification, the Engineer will forward requested Drawings (with Engineering seal removed) through the prime design firm for use by the Contractor.

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1.22 OWNER TRAINING

A. Owner training is required by other sections of these Specifications. The Contractor must include evidence of completed Owner training with (bound within) the Operation and Maintenance manuals. Such evidence of completed Owner training shall include the following:
   1. Owner training log to include:
      a. Typewritten names with job titles and signatures for each person in attendance.
      b. The time, date, and duration of each training session.
      c. A comprehensive list of all training topics covered.
      d. A comprehensive list of all demonstrations and/or hands-on training for items such as systems programming, maintenance techniques, etc.
   2. Copy of audio and/or video recordings of training sessions where such recordings are required by other sections of these Specifications.

END OF SECTION 20 00 00

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SECTION 20 00 10 - MECHANICAL AND ELECTRICAL SYSTEMS COMMISSIONING – COMMISSIONING PLAN

PART 1 - GENERAL

1.1 CITY OF CORPUS CHRISTI PROJECT INFORMATION

A. Commissioning Provider Name: Jared Merdes, PE, Stridde, Callins and Associates, Inc.
B. Project Name: CALALLEN ISD High School Stadium Renovations.
C. City of Corpus Christi Application Number:_____
D. Project Address: 4001 Wildcat Drive.

1.2 SYSTEMS TO BE COMMISSIONED

A. Mechanical HVAC Systems:
   1. Packaged and Split HVAC Units.
   2. Control Systems.
   3. Air Fans.

B. Electrical Lighting Systems:
   1. Interior Systems:
      a. Occupant Sensor Controls.
      b. Time-Switch Controls.
   2. Exterior Systems:
      a. Building and Site: Time-Photo Controls.

1.3 SCOPE

A. Purpose of the Commissioning Plan:
   1. To perform commissioning requirements in strict accordance with the International Energy Conservation Code – 2015 Edition, Section C408.
   2. To provide direction for the commissioning process during construction, providing resolution for issues such as scheduling, roles and responsibilities, line of communication and reporting, approvals, and coordination for the project location.
   3. Commissioning shall assist Owner operational staff with training and familiarization with new systems. Shall serve as a tool to reduce post-occupancy critical systems operational difficulty and failure. Shall also be used to develop test protocol and record the associated test data in an effort to advance the building systems from a state of substantial completion to a full dynamic operation.

B. Commissioning Goals and Objectives:
   1. Commissioning is a systematic process of ensuring that systems perform according to the engineered design and to the Owners operational requirements. All equipment and systems shall be installed per engineered plans and specifications and manufacturer’s installation instructions and the best practices and standards of the industry.

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2. Commissioning will include documenting the design intent, followed by activities in the construction, acceptance, and warranty phases of the project. The participation of the contractor for commissioning activities will follow the requirements defined in this commissioning plan and related documents. The main phases of the commissioning process are as follows:
   a. Equipment and Materials Submittal Verification.
   b. Installation Verification.
   c. Pre-Functional Test - System Startup.
   d. Test, Adjust, and Balancing.
   e. Functional Performance Testing.
   f. Preliminary Commissioning Report:
      1) OW approval of Preliminary Commissioning Report.
      2) AHJ approval of Preliminary Commissioning Report.
   g. Documentation Requirements, Closeout:
      1) Owner training.
      2) O&M Documentation.
      3) Final TAB.
      4) Final Commissioning Report.

C. The Contractor and all sub-contractors shall include the cost of performing work as detailed in this commissioning plan within their base bid proposal. Contractor is encouraged to review project commissioning requirements prior to submitting a bid proposal.

1.4 CODES

A. Minimum commissioning requirements shall be performed in strict accordance with the International Energy Conservation Code – 2015 Edition, Section C408 and this Commissioning Plan. In the event of conflict between the Codes and this commissioning plan, the more stringent shall govern. AHJ has final and governing authority.

1.5 DEFINITIONS

A. A/E Architect or Engineer, Design Professional.

B. CP Commissioning Provider.

C. CC Controls Contractor.

D. PM Contractors Project Manager.

E. MC Mechanical Contractor.

F. TAB Test, Adjust, and Balance Contractor.

G. EM Equipment Manufacturer.

H. EC Electrical Contractor.

I. CX Commissioning.

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J. CxP Commissioning Plan, Commissioning Process.

K. PF Pre-Functional Test.

L. FPT Functional Performance Test.

M. OW Owner.

N. AHJ Authority Having Jurisdiction – City of Corpus Christi Building Official.

O. SUBS Sub-Contractors.

1.6 RELATED SECTIONS

A. All Division 1 Sections as applicable.

B. All Division 15/23 (Mechanical) Sections as applicable.

C. All Division 16/26 (Electrical) Sections as applicable.

D. Final engineered plans approved for construction by AHJ.

1.7 GENERAL PROJECT INFORMATION

A. Location: HIGH SCHOOL STADIUM

B. OW: CALALLEN INDEPENDENT SCHOOL DISTRICT

C. CP: Stridde, Callins and Associates, Inc.; Jared Merdes, PE, MBA, LEED AP

D. Completion: July 2026 (Scheduled Completion Date)

1.8 COMMISSIONING TEAM

A. Owner staff and Representatives.

B. Commissioning Provider.

C. A/E Team.

D. Contractor and all related Sub-Contractors.

E. Equipment Manufacturers' Factory Authorized Technicians.

F. Independent TAB Contractor.

G. Independent Control Contractor.

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1.9 ROLES AND RESPONSIBILITIES

A. General: In general, the CP coordinates the commissioning activities and reports to the Owner and AHJ. General responsibilities are as listed below. All members shall work together to fulfill contracted responsibilities and meet the objectives of the Contract Documents and approved documents by AHJ.

B. General Description of Roles:
1. **CP**: Coordinates the CX process, writes and/or reviews testing plans, and coordinates testing. Performs construction observations, reviews O&M documents provided by Contractor and coordinates resolution of problems.
2. **PM**: Facilitates the CxP process, ensures that Subs perform their responsibilities and integrates the CxP into the construction process and schedule. Coordinates and schedule construction activities and schedules work with contractor personnel, sub-contractors, equipment manufacturer personnel, and owner furnished sub-contractors.
3. **OW**: Facilitates and supports the CxP and gives final approval to the CX work. Coordinates maintenance staff participation in commissioning activities and training and review of O&M.
4. **SUBS**: Demonstrate correct system performance.
5. **EM**: Equipment manufacturers and vendors shall provide documentation to facilitate the CxP and perform contracted startup.

1.10 GENERAL PROTOCOLS: The following protocols shall be used on this project.

Issues	Protocols
For requests for information (RFI) or formal documentation requests:	PM shall organize and manage and send to CP for response through approved channels.
For minor or verbal information and clarifications:	Each party may contact CP but must carbon copy PM and A/E Team on communications.
For notifying contractor or sub-contractors of deficiencies:	CP documents deficiencies through the A/E to PM, but may discuss deficiency issues with sub-contractors prior to notifying the A/E and PM.
For scheduling tests, training, and the like:	CP provides input and coordination but scheduling is the responsibility of the PM.
For scheduling commissioning meetings:	CP coordinates the dates/times and schedules through the PM.
For making a request for significant changes:	The CP does not have the authority to execute Change Orders unless CP is the A/E. Change Orders and modifications to the construction contract and construction documents are the responsibility of A/E.
For making minor changes in specified sequence of operations:	Any required changes in sequences of operations required to correct operational deficiencies must be approved and documented by the A/E team. The CP may only recommend changes in sequences unless CP is the A/E.
Subcontractor disagrees with requests or interpretations by the CP shall:	Resolve issues at the lowest level possible and document with PM. PM shall communicate and document with CP and A/E team as needed.

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PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. Contractor shall provide all test ports, gauges, photometers, instruments, test equipment, and the like as needed to accomplice work required by CxP. Instruments used for measurements shall be accurate. Calibration histories for each instrument shall be provided to CP for examination. Calibration and maintenance of instruments shall be in accordance with the requirements of NEBB, AABC standards, U.L., NTL, and the like. Test instruments shall have had a NIST certified calibration within the last 12 months unless otherwise recommended by approved agencies and standards.

2.2 TOLERANCES

A. Contractor shall verify the following:
1. Sensor and gauge instrument locations are appropriate and away from causes of erratic operation.
2. Sensors with shielded cable are grounded only at one end.
3. For sensor pairs that determine a temperature difference, ensure that they are reading within 0.1°F of each other.
4. For sensor pairs that determine a pressure difference, ensure that they are reading within 2% of each other.
5. Photo sensors are adjusted per manufacturer's installation instructions for project specific conditions such as locations from other light sources, reflective surfaces, paint finishes, and the like.

B. Calibration: Sensors and gauges shall be calibrated to tolerances listed below. Place equipment into operation. Take readings with calibration test instrument within six inches of the site sensor. Verify that sensor readings are within the tolerances in the table below of the instrument-measured value. If not, calibrate or replace sensor as needed.

Sensor/Gauge/Instrument	**Required Tolerance (+/-)**
Air Temperature	0.5°F
Water Temperature	0.5°F
Wetbulb or Dewpoint	1.0°F
Relative Humidity	3% or sensor range
Watt-hour, voltage, or amperage	4% of design
Pressure; air, water, or gas	3% of sensor range
Air flow rate	5% of design
Light Level	5 Footcandles

C. TAB Contractor shall adjust all equipment in accordance with the capacities show on the drawings, with permissible tolerances as follows:

Supply fans	+0% to +10%
Return	+5% to -10%
Exhaust fans	0% to -10%
Diffusers/supply grilles	-5% to +10%
Return grilles	0% to -10%
Exhaust grilles	0% to -10%

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D. Mechanical HVAC Design Conditions:
   1. Indoor Conditions:
      a. Summer: 75°F dry bulb
         55% RH
      b. Winter: 70°F dry bulb
   2. Outdoor Conditions:
      a. Summer: 100°F dry bulb
         80°F wet bulb
      b. Winter: 30°F dry bulb
   3. Mechanical Systems: Design conditions for mechanical equipment shall be listed in equipment sequence of operations.

E. Electrical Lighting Design Conditions: Automatic lighting systems design and operational requirements are indicated on electrical drawings and Division (16/26) specifications as applicable.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor and sub-contractors shall be responsible for testing and operating equipment and collection of pertinent data during system testing. The Contractor shall submit to the CP documentation of testing as required by this commissioning plan.

B. CP shall create CX documents based on manufacturer's installation requirements of final equipment provided on project. Testing documents and procedures shall require the following at a minimum:
   1. Test Number; Date and Time of Test
   2. Indication of whether the test document is for a first test or retest following correction of a problem or issue.
   3. Identification of system, sub-system, assembly, or equipment.
   4. Equipment name plate and characteristic data.
   5. Conditions under which the test was conducted, including (as applicable) ambient conditions, set points, override conditions, and status and operating conditions that impact the results of the test.
   6. Expected performance of the systems and assemblies at each step of the test.
   7. Narrative description of observed performance of the system, equipment, or assembly.
   8. Notation to indicate whether the observed performance at each step meets the expected results.
   9. List of any deficiencies as applicable.
   10. Issue number, if any, generated as the result of the test.
   11. Dated signatures of the person performing the test and of the witness.

3.2 PRE-COMMISSIONING MEETING

A. CP shall coordinate and conduct a pre-commissioning meeting to bring all members of the design, construction, and operations teams together to discuss the project and the scope of the CxP. At the meeting all parties shall discuss the scope of work, tasks, schedules, deliverables, and responsibilities for implementation of CxP. CP may

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update CxP after pre-commissioning meeting as needed and issue revised documents to the team. PM shall be responsible for including all CxP activities on official project construction schedule.

3.3 EQUIPMENT AND MATERIALS SUBMITTAL REVIEW

A. PM shall provide equipment and material product submittal data to CP for review prior to placing orders. CP shall review and provide review comments as needed to PM. Refer to Specification Section 23 05 05 for submittal requirements.

B. PM, EM, CC, MC, EC shall provide manufacturers recommended start-up, calibration, and testing procedural documents to CP during the submittal process. CA shall use these documents to create final versions of checklists used for Pre-Functional and Functional Testing performed by Contractor.

3.4 SITE REVIEWS DURING CONSTRUCTION

A. CP shall perform periodic construction observations and provide report of any required remedial actions needed to A/E, OW, PM during construction. The PM shall provide CP with information with regards to substitution or changes as needed to CP.

B. PM shall include CP in regular project communications as needed to track construction progress and general project coordination.

3.5 INSTALLATION REVIEW

A. Pre-Installation Audit:
   1. Contractor shall be responsible for completion of work including change orders and punchlist items and shall perform an audit that shall include, but not be limited to, checking of the following:
      a. All equipment is set and connected per manufacturer’s installation instructions.
      b. Piping specialties including balance, control, and isolation valves.
      c. Ductwork is installed sealed and insulated.
      d. Ductwork specialty items are installed including turning devices, balance, fire, smoke control dampers, access doors, and the like.
      e. HVAC and Lighting control system remote sensors are mounted and wired back to systems.
      f. Identification of piping, valves, equipment, controls, and the like.
      g. Major equipment, pumps, valves, starters, gauges, thermometers, and the like.
      h. Electrical power systems are connected and terminated.
      i. Control systems are completely connected and terminated.
   2. Contractor shall provide written proof of audit and correct all work that is found incomplete, incorrect, or non-functional during audit before contacting CP for project review.

B. PM shall schedule project observation review with CP once systems are installed and ready for pre-functional testing. CP shall review completed construction and provide written report to PM of any corrective actions needed. PM shall coordinate corrective actions with sub-contractors and schedule return visit with CP once work is completed.

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C. Contractor may not proceed to pre-functional testing until CP is satisfied with systems installation and any corrective actions taken.

3.6 PRE-FUNCTIONAL TESTS – SYSTEMS STARTUP

A. General:
1. Pre-Functional Checklists shall be developed for systems required to be commissioned by CP based on manufacturer's data sheets and instructions, drawings and specifications, to include the required installation, checkout, and start up procedures.
2. CP shall issue draft version of recommend Checklists to PM for PM and sub-contractor review and consideration before issued final Checklists.
3. Contractor shall perform testing and complete forms. All forms must include testing date, time, equipment name plate data, and technician(s) signature performing the work.

B. Testing:
1. Startup shall include but not limited to the following:
   a. Flushing and cleaning of systems.
   b. Replace and/or clean all filters, strainers, and screens.
   c. Verify valve and damper operations.
   d. Mechanical test
   e. Electrical tests
   f. Control system tests
   g. Pressure tests
   h. Safeties check
   i. Chemical treatment
   j. Manufacturer's Recommended tests
   k. Sensor adjustment check
2. PM shall schedule PF testing upon receipt of check lists from CP and confirmation from all sub-contractors that systems are ready for testing.
3. Contractor shall complete testing and deliver test documents to CP for review.
4. CP shall review PF tests for completeness before PM schedules Functional Performance Testing.
5. Contractor shall correct all deficiencies identified during testing before moving to next phase of work.

3.7 TEST, ADJUST, AND BALANCING

A. General: TAB shall start after completion of pre-functional testing. TAB work shall be performed in accordance with applicable specifications**.**

B. Air System Balancing: Air systems shall be balanced in a manner to first minimize throttling losses then fan speed shall be adjusted to meet the design flow conditions.

C. Hydronic System Balancing: Individual hydronic heating and cooling coils shall be equipped with means of balancing and measuring flow. Hydronic system shall be proportionately balanced in a manner to first minimize throttling losses, then the pump impeller shall be trimmed or pump speed shall be adjusted to meet design flow conditions. Each hydronic system shall have either the capabilities to measure pressure across the pump, or test ports at each side of each pump.

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D. Control and Mechanical Coordination: TAB contractor will be required to assist in setting specific air volumes, static pressures and the like for both Control Systems and Mechanical equipment in response to requirements of equipment sequence of operations and manufacturer's specific requirements. TAB contractor shall work is PM during the process to assist with coordinating required activities with appropriate sub-contractors. TAB report shall include specific coordination data as required to document coordination such as:
   1. Fan speed %.
   2. Static pressure setpoint recommendations.
   3. Damper positions.

E. Preliminary TAB reports shall be provided to CP before start of FPT. Reports shall include setpoint recommendations that were coordinated with control system contractor for each piece of equipment. PM shall provide confirmation that control system contractor has received reports and all recommended setpoints have been entered into the control system and appropriate sequences implemented.

3.8 FUNCTIONAL PERFORMANCE TESTING

A. General:
   1. Functional performance testing verifies the intended operation of individual components and system interaction under various conditions and modes of operation. The systems are run through all of the sequence of operation and the responses of the components are verified. Testing proceeds from components to subsystems to system, and finally to interlocks and connections between systems.
   2. FPT shall be developed for systems required to be commissioned by CP based on manufacturer's data, drawings and specifications, to include the required installation, checkout, and start up procedures.
   3. Contractor shall perform testing and complete forms. All forms must include testing date, time, and technician(s) signature performing the work.
   4. FPT shall not start until successful completion of the following minimum items and written documentation is provided to CP:
      a. Pre-Functional Tests are completed in good order and received by CP with no remaining deficiencies that would affect FPT.
      b. TAB work is complete and report is provided with no remaining deficiencies that would affect FPT.
      c. Control contractor has verified that all control systems are completely integrated with mechanical and electrical systems and are fully functional as per equipment sequence of operations for all systems requiring commissioning.

B. Testing:
   1. PM shall schedule FPT upon receipt of check lists from CP and confirmation from all sub-contractors that systems are ready for testing.
   2. Contractor shall complete testing and deliver test documents to CP for review. Contractor shall clearly identify any discrepancies observed during testing on reports. CP may attend complete testing or parts of testing as applicable.
   3. CP shall review FPT for completeness.

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4. Contractor shall take corrective actions as necessary to correct any deficiencies found during testing and document all deficiencies and repairs in a Deficiency Report. Contractor shall repeat FPT until systems operate in accordance with approved plans and specifications. Deficiency Report shall include all details of the components and systems found to be non-compliant with the parameters of the functional performance test plans and design documents. The deficiency report shall become part of the functional performance testing documentation. The report shall detail the adjustments or alterations required to correct system operation and identify the responsible party. The report shall be continuously updated as needed.
5. CP shall schedule demonstration of final systems performance with PM after Contractor has completed functional performance testing and all documented deficiencies have been corrected.

C. Equipment Requirements: Equipment functional performance testing shall demonstrate the installation and operation of components, system, and system-to-system interfacing relationships in accordance with approved plans and specifications such that operation, function, and maintenance serviceability for each of the commissioned system is confirmed. Testing shall include all modes and sequence of operation, including under full-load, part-load and the following emergency conditions:
1. All modes as described in the sequence of operation.
2. Redundant or automatic back-up mode.
3. Performance of alarms and safeties.
4. Mode of operation upon a loss of power and restoration of power.

D. Controls Requirements:
1. Control systems shall be tested to document the control devices, components, equipment and systems are calibrated and adjusted and operate in accordance with approved plans and specifications. Sequence of operation shall be functionally tested to document they operate in accordance with approved plans and specifications.
2. Lighting controls shall be adjusted and tested to meet the minimum requirement of 2015 IECC, C408.3 in addition to manufacturer’s test requirements.
   a. Occupancy Sensor Control Testing: 2015 IECC, C408.3.1.1.
   b. Time-switch Control Testing: 2015 IECC, C408.3.1.2.

3.9 PRELIMINARY COMMISSIONING REPORT

A. CP shall provide a preliminary report of commissioning test procedures and results and provide report to Owner. Report shall be identified as “Preliminary Commissioning Report” and shall identify the following:
1. Itemization of deficiencies found during testing required by this section that have not been corrected at the time of report preparation.
2. Deferred tests that cannot be performed at the time of report preparation because of climatic conditions.
3. Climatic conditions required for performance of the deferred tests.

B. Acceptance of Report: Buildings, or portions thereof, shall not be considered acceptable for a final inspection until the AHJ has received a letter of transmittal from the building owner acknowledging that the building owner has received the Preliminary

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Commissioning Report. A copy of the Preliminary Commissioning Report shall be provided to AHJ upon request.

3.10 DOCUMENTATION REQUIREMENTS, CLOSEOUT

A. The following shall be provided to OW no more than 90-days of date of receipt of Certificate of Occupancy or passing of Final Inspection by AHJ.
   1. Operation and Maintenance Manuals in accordance with Specification Section 23 05 05.
   2. Owner Training in accordance with Specification Section 23 05 10.
   3. Final TAB Reports in accordance with Specification Section 23 05 93.
   4. Final Commissioning Report: CP shall create a report of test procedures and results identified as “Final Commissioning Report” and deliver to building Owner or deliver to Contractor for inclusion in final O&M manuals. The report shall be organized with commissioned systems findings in separate sections to allow independent review. The report shall include the following at a minimum:
      a. Results of FPT and CxP.
      b. Disposition of deficiencies found during testing, including details of corrective measures used or proposed.
      c. Actual Final Pre-Functional and Functional PT used during the commissioning process including measureable criteria for test acceptance, providing herein for repeatability.
      d. Final Test, Adjust, and Balance Reports.

END OF SECTION 20 00 10

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SECTION 22 05 00 - PLUMBING GENERAL CONDITIONS

PART 1 - GENERAL

1.1 SCOPE

A. The Work to be provided under this Division of Specification shall include the furnishing, delivering, transporting, unloading, hoisting, handling, scaffolding, storing, erecting, adjusting, and testing of all materials, apparatus, and equipment required for complete, properly adjusted and operable plumbing systems for this project in accordance with the Contract Documents. Provide all labor, supervision, coordination, equipment, tools, materials, permits, fees, and connection to utilities necessary for the completion of this Work.

B. If details or special conditions are required in addition to those shown on Drawings, provide all material and equipment usually furnished with such systems or required to complete their installation, whether noted in Contract Documents or not.

C. The Instructions to Bidders, Notice to Bidders, General Conditions, Special Conditions, all other preface Sections, all technical divisions and all appendixes of the Specifications, and any other pertinent documents issued by Owner's representative shall be considered as part of this Division insofar as they may be applicable.

D. The Architectural, Civil, Structural, Plumbing, Heating, Ventilating and Air Conditioning (HVAC) and Electrical Plans and Specifications and any other pertinent documents issued by Owner's representative shall be considered as part of this Division insofar as they may be applicable.

E. Refer to Division 1 Specifications for general requirements of the following items:
1. Work by Owner.
2. Work sequencing and phasing.
3. Third party commissioning coordination requirements.

1.2 CODES AND STANDARDS

A. The Codes and Standards of the following organizations shall generally apply where applicable and where no specific Codes and Standards have been cited. In the event of conflict between the Codes and Standards of these organizations, the more stringent shall govern.

B. Abbreviations of standards organizations referenced in this and other sections:

ANSI:	American National Standards Institute.
ASA:	American Standard Association.
ASHRAE:	American Society of Heating Refrigeration and Air Conditioning Engineers.
ASME:	American Society of Mechanical Engineers.
ASPE:	American Society of Plumbing Engineers.
ASSE:	American Society of Sanitary Engineering.
ASTM:	American Society for Testing and Materials.

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AWS: American Welding Society.
AWWA: American Water Works Association.
CISPI: Cast Iron Soil Pipe Institute.
CS: Commercial Standards, Products Standards, Office of Eng. Standards Service, NBS.
EPA: Environmental Protection Agency.
FM: Factory Mutual Engineering Company.
FS: Federal Specifications, Superintendent of Documents, U.S. Government Printing Office.
IAPMO: International Association of Plumbing & Mechanical Officials.
IEEE: Institute of Electrical and Electronics Engineers.
ISA: Instrument Society of America.
IRI: Industrial Risk Insurers.
MCA: Mechanical Contractors Association.
MICA: Midwest Insulation Contractors Association.
MSS: Manufacturers Standardization Society of the Valve & Fitting Industry, Inc.
NBS: National Bureau of Standards.
NEC: National Electric Code.
NEMA: National Electrical Manufacturer's Association.
NFPA: National Fire Protection Association.
NSF: National Sanitation Foundation.
OSHA: Occupation Safety and Health Administration.
PDI: Plumbing and Drainage Institute.
PFI: Pipe Fabrication Institute.
SMACNA: Sheet Metal and Air Conditioning Contractors' National Association Inc.
STI: Steel Tank Institute.
UL: Underwriters Laboratories, Inc.

C. Standards referenced in this section:
ACI 614: Recommended Practice for Measuring, Mixing and Placing of Concrete.
ASTM D1557: Standard Test Method for Moisture-Density Relations of Soils.
ASTM E814: Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
UL 1479: Fire Test of Through-Penetration Firestops.
UL 723: Surface Burning Characteristics of Building Materials.

D. All workmanship, material, and equipment shall be in accordance with all local, state, and federal codes, ordinances and regulations.

1.3 DEFINITIONS

A. “Contract Documents" shall refer to the complete package of Plans, Specifications, addenda, and special conditions used as a basis for the General Construction Contract for this project including but not limited to all General and Special Conditions, all Architectural and Engineering Divisions of Specifications and all Architectural and Engineering Plans.

B. “Owner” means the entity specified in the General Construction Contract as Owner.

C. "Contractor" means the entity contracting with the Owner for the performance of work.

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D. “Work” means all of the Contractor’s obligations under the Contract.

E. “Provide” shall mean furnished and installed, complete and ready for intended use by Contractor, except as otherwise noted.

F. “Furnish” shall mean purchase only by Contractor; installation by others, except as otherwise noted.

G. “Install” shall mean Contractor to set up for use, erect or construct only; purchase by others, except as otherwise noted.

H. "Directed" means "directed by Owner’s representative”. This shall not imply that Architect's or Engineer's responsibility extends into the Contractor's area of construction supervision.

I. Where the words "similar" or "typical" are used, they shall be used in their general sense and shall not be interpreted as meaning identical. Details shall be worked out in relation to their location and connections to other parts of work.

J. Items such as but not limited to access doors, sleeves, cleanouts, trap-primers, roof flashings, or pipe supports that are to be installed repetitiously and are noted on the Plans as "typical" shall be installed at every location required by Specifications, codes, or good practice, whether specifically shown on Plans or not.

K. Where the terms "or equal" and "or approved equal" are used they shall be defined as "approved as equal by Owner’s representative".

1.4 CONTRACTOR'S RESPONSIBILITY

A. It shall be the responsibility of the Contractor to carefully examine all of the Contract Documents and to comply with them in every respect. Should there be omissions or discrepancies in the documents notify the Owner’s representative prior to the bid date so a written clarification can be issued.
   1. Coordinate exact electrical requirements of all equipment prior to submittal review and make all modifications necessary for full compatibility with the final electrical installation.

B. It shall be responsibility of the Contractor to review all Divisions of the Contract Documents with respect to plumbing work that will be required by other divisions. Contractor shall thoroughly review all aspects of Plumbing Bid Proposal prior to bidding for the purpose of clearly defining the scope of Plumbing Bid Proposal with that of all other trades.

C. It shall be the responsibility of the Contractor to provide all equipment, materials, and labor, whether specifically indicated on Plans or called for in Specifications or not, which are necessary for the proper installation and function of the plumbing systems for this project.

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D. It shall be the responsibility of the Contractor to carefully examine conditions of the project site and to check the work of other divisions that might affect the plumbing work. Include all costs of demolition, cutting, patching, and repairing of existing elements in bid proposal.
   1. Visit the proposed project site prior to bid and carefully investigate existing streets, parking lots, paved areas, sidewalks, buildings, structures, and landscaping.

E. It shall be the responsibility of the Contractor to contact the Owner's representative prior to commencement of any trenching or site utility work for assistance in locating underground utilities. Hand dig where necessary to verify depth and location and to avoid damage to existing.

F. It shall be the responsibility of the Contractor to coordinate work performed under the Plumbing Division of the Contract Documents with work performed under other divisions so as not to delay or damage any part of this installation.

G. It shall be the responsibility of the Contractor to coordinate the location of chases, openings, sleeves, flashings, trenches, and the like required for the work covered by the Plumbing Division of the Contract Documents. Do so in sufficient time for proper coordination with general construction, or assume the responsibility for required cutting and patching. No cutting of structural members shall be performed without approval of the Owner's representative.

H. It shall be the responsibility of the Plumbing Division to include minor details necessary for proper installation and operation of materials, equipment, or fixtures as if specified or shown in Contract Documents.

I. It shall be the responsibility of the Contractor to install materials, equipment, and fixtures according to code requirements, manufacturer's recommendations or as required in Contract Documents, whichever is more stringent.

1.5 ADDITIONAL COMPENSATION

A. Failure to examine or to comply with Contract Documents shall not relieve Contractor of responsibility for the work or be used as basis for additional compensation.

B. No additional compensation will be awarded for conflict with Architectural, Structural, Electrical, or Mechanical components in installation of prefabricated materials or equipment.
   1. Piping shall be fabricated from field measurements. Adjust piping as necessary to fit space available. Contractor shall advise Owner's representative of any discrepancies prior to fabrication.

C. No compensation will be awarded to the Contractor for minor relocations or deviations from plans. Changes in contract price will be allowed only for additions to or changes to original design intent and then only with written approval of the Owner's representative.

D. Omission of Architectural, Civil, Structural, Electrical, or other pertinent details from Mechanical Contract Documents shall not be used as basis for additional compensation.

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E. No compensation will be awarded to the Contractor for failure to coordinate exact electrical requirements with electrical division prior to ordering equipment.

1.6 SUPERVISION, LABOR, AND WORKMANSHIP

A. Contractor shall provide proper supervision of mechanics and subcontractors performing work under this Division. Labor shall be performed by skilled mechanics experienced in their particular trade. Piping and equipment shall be installed square and plumb, with accessibility for proper operation and service. Any item that does not present a neat and workmanlike appearance shall be replaced or corrected at the direction of the Owner's representative and without additional cost to the Owner or Design Professionals.

B. Submit welder's certificates and resume of experience for all mechanics on this project when directed to do so by Owner's representative.

1.7 LICENSING

A. Contractor shall be licensed to perform project work in accordance with Federal, State, and Local licensing requirements as applicable.

1.8 FEES AND PERMITS

A. Contractor shall obtain and pay for all fees and permits required for the completion of the Work, including but not limited to construction permits; federal, state, and local inspection fees, connections to utilities, meter and tap fees, capitalization charges, temporary service charges, and any other associated fees or charges.

1.9 PROJECT/SITE CONDITIONS

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.

B. These Specifications and the accompanying Drawings are intended to describe and illustrate systems which will not interfere with the structures, which will fit into available spaces, and which will ensure complete and satisfactorily operating installations. Coordinate the proper fitting of the material and apparatus into the available spaces without interfering with other building components. Prepare installation drawings at all locations where possible conflicts of HVAC, Plumbing, Electrical, Structural, or Architectural components may occur. The installation drawings shall be submitted to the Owner's representative prior to commencing the Work. They should illustrate the installation of work in relation to other portions of the Work. Interferences with other portions of work, or the building structure, shall be corrected before the work proceeds. Should changes become necessary on account of failure to comply with these stipulations, make such necessary changes.

1.10 PRE-INSTALLATION CONFERENCE

A. Contractor shall convene a pre-installation conference one (1) week prior to commencing work of this Division and in conjunction with work of other divisions and notify Owner's representative of date and time of meeting.

B. Require attendance of parties directly affecting work of Division 22.

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C. Review installation procedures and coordination required with related work.

D. Establish “right of way” and routes for conduit, wiring, cable trays, piping, ductwork, and similar elements in the available space above ceilings and vertical chases.

E. Coordinate exact HVAC and service access requirements of all plumbing and electrical equipment, as example, ventilation and exhaust of panelboards, transformers, or water heaters. Advise Owner’s representative of any requirements that will be necessary in addition to requirements on Contract Documents.

1.11 GENERAL REQUIREMENTS

A. Protection of Rough Work: All openings of every description shall be securely capped or otherwise protected against debris or other foreign material entering the system until such time as the equipment is permanently attached.

B. Cleaning and Adjusting: At the completion of the work all parts of the installation shall be thoroughly cleaned. All valves and controls shall be adjusted for proper operation. Upon completion of the work, the Contractor shall leave the building and project site in a neat condition.

C. Defective work: If inspection or testing show defects, such defective work or materials shall be replaced and inspection and test repeated. All repairs to piping shall be made with new material. No caulking of screwed joints will be acceptable.

D. Dielectric Connection: Where dissimilar metals are connected, provide approved dielectric connector to protect against dielectric corrosion.

E. Vents through Roof: Vents through roof shall be installed as closely as possible to locations shown on Drawings. However, in no case shall vents through roof be installed within ten feet of air conditioning outside air intakes. It shall be the responsibility of the Contractor to coordinate with the Plumbing and HVAC Divisions and offset vent piping as necessary. Offsets will be made at no additional cost to the Owner or Design Professionals.

F. Surveys and Measurements: Carefully survey project site prior to bidding and installation. Dimensions, both horizontal and vertical, shall be derived from Architectural, Civil, and Structural plans. Do not "scale" plans; that is do not measure plans with Architect's or Engineer's scale and base installation dimensions on such measurements.

G. Horizontal and vertical measurements shall be based on established benchmarks. Work shall agree with established lines and levels. Field verify measurements at project site. Check correctness of same as related to work prior to fabrication of shop made items and ordering of factory-built items.
   1. Notify Owner’s representative of discrepancies between plans and actual field conditions that will prevent the following of good practice or affect the intent of Plans and Specifications. Do not proceed with installation until instructions are received from Owner’s representative.

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H. The accompanying plans show diagrammatically the sizes and location of the various equipment items and the sizes of the major interconnecting piping and ductwork, without showing exact details as to elevations, offsets, control lines, and other installation details. The Contractor shall carefully lay out his work to conform to the site conditions, to avoid obstructions and provide proper grading of lines. Exact locations of outlets, apparatus, and connections thereto shall be determined by reference to the accompanying Plans, to all detail drawings, equipment drawings, rough-in drawings, etc., by measurements at the building, and in cooperation with other divisions, and in all cases shall be subject to the approval of the Owner's representative. Minor relocations necessitated by the conditions at the site or directed by the Owner's representative shall be made without any additional cost to the Owner.

I. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted on the Drawings.

J. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction may be required for work indicated or specified in this Section or work specified in other Sections, it shall be the responsibility of the Contractor to provide same as well as to provide material and equipment usually furnished with such systems or required to complete the installation, whether mentioned or not.

K. Should a discrepancy exist between the Plumbing Drawings and the Plumbing Specifications it is the Contractor's responsibility to include that portion or portions of the more expensive item in bid proposal. Final approval and/or directive can then be forwarded to the Contractor during the submittal process.

1.12 FIXTURE AND EQUIPMENT SIZES AND REQUIREMENTS

A. Space allocations in machinery spaces are based on equipment scheduled in each case. Should the Contractor offer equipment of another make that requires more space in any critical dimension, the Contractor shall submit, together with other submittal data on the equipment, prints of drawings indicating how the equipment may be installed, indicating room for servicing and revisions in piping or ducting and any other details necessary for the Owner's representative to form a judgment as to the suitability of the substitute material, as to performance, suitability for the space and other variables.

B. Duties of certain equipment items, horsepower of driving motors and electrical characteristics are scheduled for equipment items of a particular make in each case. Should any substitute material be accepted which has other requirements that would involve allied equipment or the work of others, the Contractor shall be responsible for all modifications required at no change in contract price.

C. Structural steel members are indicated to provide supports for certain specific sizes and weights of equipment. Should other equipment be offered, the spacing of the supports shall be varied to suit the equipment. Should the weight or size of a substituted item of equipment require additional supporting steel members, the Contractor shall be required to provide and install them at no change in contract price.

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1.13 INTERFACE WITH OTHER PRODUCTS

A. Review millwork shop drawings. Confirm location and size of equipment and openings before ordering equipment, rough-in, and installation.

1.14 SUBMITTALS

A. Submit in timely manner for review, brochures describing all materials, equipment, fixtures, and specially fabricated structures proposed for use in the performance of the work on this project.

B. Substitutions, unless a sole source manufacturer is justified and approved by Calallen Independent School District in writing, shall be allowed for materials or equipment for which the performance, capacity and quality are equal to that scheduled or specified. Use the terms, "or approved equal," and include on the drawings and in the specifications the following paragraphs:

1. "It is the intent of the Drawings and/or Specifications neither to limit products to any particular manufacturer nor to discriminate against an APPROVED EQUAL product as produced by another manufacturer. Some proprietary products may be mentioned to set a definite standard for acceptance and to serve as a reference in comparison with other products. On the other hand, when a manufacturer's name appears in these Specifications or in the Drawings, it shall not be interpreted that the manufacturer is unconditionally acceptable as a provider of equipment for this project. The successful manufacturer or supplier shall meet all of the provisions of the appropriate specification(s).
2. "The specified products have been used in preparing the Drawings and Specifications and thus establish minimum qualities with which substitutes must be at least equal to be considered acceptable. The burden of proof of equality rests with the Contractor. The decision of the Engineer is final.
3. "In the event that the Contractor submits a proposal for a substitution, and the review and negotiation of the substitution (if handled in a timely, expedited manner) results in a delay of the project, then a reasonable extension of time for the contract may be allowed."

C. Items to be submitted shall include but shall not be limited to pipe, valves, fittings, materials, hangers, special supports, insulation, fixtures, equipment, controls, coordination drawings, and mechanical room layouts.

D. Contractor’s Coordination Drawings: The Contractor shall prepare a complete set of coordination drawings indicating the equipment actually purchased and the exact routing for piping, conduit, and ductwork. The elevations, locations, support points, load imposed on the structure at support and anchor points, and size of all lines shall be indicated. All beam penetrations and slab penetrations shall be indicated and sized and shall be coordinated. This requirement for coordination drawings shall not be construed as authorization for the Contractor to make any unauthorized changes to the Contract Drawings. All Design Drawing space allocations shall be maintained, such as ceiling height, chase walls, equipment room size, and the like, unless proper written authorization is received from the Architect to change them.

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E. Information shall be presented so that line-by-line comparison may be made with Contract Documents. Deviation from Contract Documents shall be enumerated on separate sheet and so entitled. Data of general nature will not be acceptable.

F. Each submittal will be reviewed for compliance with general requirements of design and arrangement only; it is not a contract document and acknowledgment of compliance does not remove the Contractor of responsibility for performance of the work in compliance with all provisions and requirements of the Contract Documents. Job measurements and the coordination of all the dimensions for proper fit of all parts of the work and performance of all equipment supplies to meet Specification requirements are and remain specific responsibilities of the Contractor.

G. Each submittal shall be neatly organized in binders or electronically with information arranged in order of specification section. Submit Plumbing divisions independently with a maximum of three separate packages (hard copies) for each division, as example, major equipment, materials, and controls. In each brochure provide cover sheet identifying project name and location, Architect, Engineer, General Contractor, and Plumbing Contractor. Include Contractor's addresses and phone numbers. Provide adequate space for Architect's and Engineer's stamps. Contractor shall include and sign the following statement of compliance on the cover sheet:

I hereby certify that this shop drawing and/or brochure has been checked prior to submittal and that it complies in all respects with the requirements of the Contract Documents for this project.

(Company Name)
Signed
Date

Submittals forwarded (electronic or hard copied) without compliance statement and signature in each brochure will not be reviewed. Contractor will bear the risk of all delays, as if no submittal had been delivered.

H. Contractor’s statement of compliance shall constitute a representation to the Owner’s representative that Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data or assumes full responsibility for doing so, and that Contractor has reviewed or coordinated each submittal with the requirements of the work and the Contract Documents.

I. Engineer’s review of submittals does not relieve Contractor of his responsibility for deviations from Contract Documents or errors and omissions except when acceptance of the specific deviation is given in writing.

J. Engineer’s review and approval is only for conformance with the design concept of the project and for compliance with the information given in the Contract.
1. The review shall not extend to means, methods, sequences, techniques, or procedures of construction or to safety precautions or programs incident thereto.
2. The review shall not extend to review of quantities, dimensions, weight or gauges, fabrication processes or coordination with the work of other trades.

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K. Submit brochures in sufficient time and of proper format so as to avoid delays or changes in construction. Failure to comply shall render Contractor liable for expenses of delays occasioned by failure to provide necessary information or drawings. Owner's representative reserves the right to contact manufacturer directly to secure proper data and detail when deemed necessary. Contractor shall be liable for costs incurred by such action.

L. Any shop drawings prepared to illustrate how equipment, piping, ducts, and the like are to be fitted into available spaces will be examined under the assumption that the Contractor has verified all the conditions, and obtaining any approval thereon shall not relieve the Contractor of responsibility in the event the material cannot be installed as shown on those Drawings.

M. Any material or equipment installed without the Owner representative's prior approval shall, if so, directed by the Owner's representative be removed and replaced with approved material or equipment at the Contractor's expense.

N. Any dimensional changes or rerouting of piping shall necessitate submittal or shop drawings of the system under consideration prior to fabrication or erection of material. Drawings will be utilized by the Owner's representative to evaluate the effect of the proposed changes on equipment performance.

O. Test Reports: The Contractor shall submit to the Owner's representative all test reports in accordance with details specifically called for in the various Sections of the Specifications in this Division.

1.15 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Upon completion of work, provide three (3) sets of complete operations and maintenance instructions of plumbing equipment, neatly bound in 3 ring binders. Provide each binder with the name of Owner, Architect/Engineer, Contractor, and Title. During the construction period, accumulate the following for inclusion in the Operating and Maintenance Manuals:
   1. Tabulation of equipment by manufacturer, model number, and serial number.
   2. All warranties and guarantees and manufacturer's directions on equipment and material covered by the Contractor.
   3. Approved fixture brochures, wiring diagrams, and control diagrams.
   4. Copies of shop drawings and submittals.
   5. Operating instructions for all plumbing equipment and systems. Operating instructions shall include maintenance and seasonal changeover procedures.
   6. Recommended maintenance procedures.
   7. Repair parts list of all major items and equipment including name, address, and telephone number of local supplier or agent.
   8. Valve tag charts and diagrams specified elsewhere herein.
   9. Manufacturer's letter certifying that the equipment has been installed per manufacturer's installation manuals.
   10. Contractor's one (1) year warranty letter including start and finish dates.

B. Operation and Maintenance instructions shall be submitted and approved prior to instruction of Owner's personnel in the various systems operation and maintenance.

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1.16 UTILITIES

A. The Contract Documents reflect the general location, size, and manner of routing for all utilities known to be required on this project. It shall be the responsibility of the Contractor to visit the site, in order to coordinate and confirm the exact requirements for all utilities. The bid submitted by the Contractor shall include costs for all such coordination work as well as any and all charges and/or fees.

B. Interruption or changes to existing services must be given prior written approval from the Owner's Project Representative. If interruption is required, coordinate scheduling of down-time with the Owner to minimize daily activity disruption.

1.17 BUILDING CONSTRUCTION AND LAYOUT OF WORK

A. The Contract Documents are diagrammatic in character and cannot show every connection in detail or every line or conduit its exact location. These details are subject to the requirements of ordinances and also Structural and Architectural conditions. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases unless specifically noted or indicated to be exposed. Work shall be installed to avoid crippling of structural members; therefore, inserts to accommodate hangers shall be set before concrete is poured, and proper openings through floor, walls, beams, etc. shall be provided as hereinafter specified or as otherwise indicated or required before concrete is poured. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted.

1.18 RECORD DRAWINGS

A. As part of the required plumbing work, a complete set of record drawings shall be made up and delivered to the Owner's representative.

B. The drawings shall reflect the following:
   1. All plumbing work installed exactly in accordance with the original design.
   2. All plumbing work installed as a modification or addition to the original design.
   3. The dimensional information necessary to delineate the exact location of all ductwork and piping runs which are so concealed as to be untraceable by inspection through the regular means of access established for inspection and maintenance. Where shop drawings have been prepared and approved, the record drawings shall be cross referenced to the respective shop drawings. In this case dimensions need not be shown on the record drawings.

C. Record drawings shall include the updating of all equipment schedules.

D. The record drawings shall be of a reproducible type as directed.

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1.19 WARRANTY

A. All materials and equipment, to be furnished and installed under this Division of the Specifications shall be warranted to meet the specified performance requirements and to be free of defects in materials and workmanship for a period of one year after final acceptance. The Contractor to the complete satisfaction of the Owner's representative shall remedy deficiencies caused by other than normal usage, without cost to the Owner or Design Professionals.

B. If there is any indication that the equipment does not meet the specified quantities, the Contractor shall, at his expense, institute a program to demonstrate the adequacy of the installation. This program shall include all necessary testing and testing equipment. Should the Contractor not have the equipment or technical skill to perform the tests, it shall be his responsibility to employ recognized experts to perform the tests and shall provide certified laboratory tests, certified factory reports and work sheets, or other certified data to support results of any tests required.

C. Equipment warranties extending beyond the first-year warranty generally include material only guarantees except where required by specific reference. Owner is responsible for additional expenses and the assembly of adequate record keeping during warranty period.

1.20 BILLINGS

A. Contractor shall provide a schedule of values of the plumbing work with each payment application. Provide a line item for labor and materials for each section of specifications. Provide additional breakdown where requested by Owner's Representative.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Coordinate exact electrical requirements of plumbing equipment prior to submittal and purchase. Equipment that is not compatible with electrical installation will be removed and replaced at no expense to the Owner or Design Professionals.

2.2 MATERIALS

A. Unless otherwise specified, provide only new, first grade equipment and materials which comply with requirements of this Specification and applicable Standards.

B. Furnish, if required, satisfactory evidence of kind and quality of materials proposed for use.

C. Similar items of material and equipment shall be product of same manufacturer.

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2.3 SUBSTITUTIONS

A. The Specifications indicate a standard of quality for materials. Manufacturer's names and catalog numbers are used to designate materials or equipment to establish grade and quality. Where several manufacturers are named, the bid shall be based on those named manufacturer's products. Where only one manufacturer is named, unless stated otherwise, manufacturers of equal quality products will be considered as substitutions only if submitted at least 5 days before the bid date and when in compliance with all criteria set forth within Section 2.3:
   1. Contractor is responsible for all coordination and additional costs which may be required for the work to be completed on time with no additional cost to the Owner or Design Professionals.
   2. Contractor to verify during submittal that the product works dimensionally within the intent of the design.
      a. The ability to service components shall not be compromised.
      b. Any additional coordination due to interference with other elements of the project will be the responsibility of the Contractor with no additional cost to the Owner or Design Professionals.

B. It is fully the Contractor's responsibility to assemble and submit sufficient technical information to fully illustrate that the material or equipment proposed for substitution is equal or superior as the Architect or Engineer is under no obligation to perform the service for the Contractor. The proposal shall be accompanied by manufacturer’s complete engineering data, specification sheet, and a sample, if practical or if requested. In no event shall a proposal for substitution be cause for delay of work.

C. Substitutions and deviations shall be clearly marked, indicated, or otherwise called to attention of the Owner’s representative in the submittal documents. Failure to indicate substituted materials and/or equipment or deviations from Contract Documents shall be construed as a representation that contractual obligations have not been meet and the submittal shall be rejected without further review.

D. Engineer reserves the right to accept or reject proposed substitutions and it is understood that his judgment shall be final.

2.4 ELECTRIC INTERLOCKS

A. When interlocking of equipment is required all wiring in excess of 50 volts to be provided by a licensed master electrician and coordinated by the Contractor. All other wiring 50 volts or less or as required by the controls/energy management system shall be fully coordinated by the Contractor to provide and assure a complete and fully operational system. All conduit for controls and or power wiring shall be in accordance with Division 26 requirements, and installed by licensed electrician and coordinated by the Contractor.

B. Except for such items that are normally wired up to their point of manufacture and so delivered and unless specifically noted to the contrary herein, the Contractor shall do all electric wiring of every character for interlocking, pilot, and control in accordance with methods and materials described within Division 26 of these Specifications. This includes conduits and mounting of all electrical devices.

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C. Furnishing of complete wiring diagrams showing proper control and interlock wiring shall be work under the trade supplying the equipment. Diagrams shall be based on the approved equipment for this project and shall be complete integral drawings, not a series of manufacturers' individual diagrams.

D. The electrical design and drawings are based on the equipment scheduled and shown on the plumbing Drawings and should any plumbing equipment requiring changes to the electrical design be approved, the required electrical changes shall be made at no cost to the Owner.

2.5 CONTROL POWER AND EQUIPMENT POWER FOR CONTROLS

A. Control power, whether it be DDC, 24 volt, or 120 volt, should be delivered to each piece of plumbing equipment, and/or control panels whether or not it is specifically indicated on the Contract Drawings.

B. It is the Contractor's responsibility to include in his or her bid all costs in connection with control wiring, and/or power, whether or not it is specifically indicated. Regardless of how large in nature or how incidental, no additional compensation will be approved by the Owner's representative or Design Professionals concerning a failure on the Contractor's part to include these costs in bid proposal or a failure on the Contractor's part to properly coordinate these important functions.

PART 3 - EXECUTION

3.1 DEMOLITION

A. Perform all demolition as indicated on drawings in order to prepare site for new work. Where piping is removed and not reconnected to new work then cap ends of existing services as part of new work. Coordinate demolition work with the Owner to minimize disruption to the existing building systems.

B. All pipe, fixtures, equipment, wiring and associated conduit, insulation and similar items demolished, abandoned, or deactivated are to be removed from site unless noted otherwise. All designated equipment and/or fixtures is to be turned over to the owner for their use at a place and time so designated. Maintain the condition of material and/or equipment that is to be reused equal to existing before work began.

3.2 PRODUCT HANDLING, RECEIVING, INSPECTION, AND STORAGE

A. Handling and Receiving: The Contractor shall receive and handle all materials and equipment with care so as not to cause damage. Use padded or strap slings, etc. as appropriate for the items being handled. Lift materials and equipment by lift points provided or recommended by the manufacturer.

B. Inspection: The Contractor shall upon receipt, inspect all materials and equipment for defects, damage, and compliance with the Specifications. When materials and equipment are received in acceptable condition, assume full responsibility for its storage, handling, and installation. Materials and equipment found to be incomplete or damaged shall be reported to the Carrier and Owner's representative immediately, within a maximum of three (3) days, for its replacement.

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C. Identification: Upon receipt of all materials and equipment, the Contractor shall identify and tag, stencil, or otherwise permanently identify all materials and equipment with the appropriate equipment number.

D. Storage: Materials and equipment, which cannot be installed immediately after delivery, shall be stored in a safe, dry location provided by the Contractor. Materials and equipment damaged or stolen while in storage shall be replaced by the Contractor at no cost to the Owner.

3.3 COORDINATION WITH OTHER DIVISIONS AND OWNER

A. General: Cooperate to fullest extent with other Divisions and Owner to the end that all work shall be executed economically without delay and that it will not interfere with their operations.

B. Progress Schedule: Contractor shall inform himself of progress schedules of all Divisions and shall work in accordance with schedules for completion of work.

C. Examine work of other trades that comes in contact with or is covered by this work. Do not attach to, cover, or finish against any defective work, or install work of this Division in a manner which will prevent other trades from properly installing their work. Consult all Drawings, Specifications, and details of other Divisions of the work.

D. Do not install equipment with electrical characteristics that are not compatible with the electrical installation.

E. Building Systems Commissioning will be performed by an independent agency under direct contract with the Owner. This Division shall assist the Commissioning Agent in the performance of his duties as required. Refer to Division 01 for the Scope of Work required of Division 22.

3.4 EQUIPMENT ACCESSORY REQUIREMENT

A. It shall be the Contractor's responsibility to assure all packaged equipment ancillary devices shall be completely wired, piped, and calibrated. All systems shall be commissioned for acceptance by the Owner.

3.5 INSTALLATION

A. Space and Equipment Arrangement: All equipment shall be installed in a manner to permit access to parts requiring service and to comply with code-mandated and manufacturer required clearances. Contractor shall notify Owner’s representative prior to installation of any equipment where said clearances cannot be maintained for further direction.

B. Materials and equipment installed under this Contract shall be new in every respect, and installed in a first-class manner in accordance with the manufacturer's recommendations and applicable codes and standards.

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C. The Contractor shall plan and coordinate his Work to provide all equipment and materials necessary to provide the Owner with a neat, functional, and serviceable installation.

D. The Contractor shall protect all work, materials, and equipment against damage until Final Acceptance by the Owner's representative. Replace, or repair to the satisfaction of the Owner's representative, any work, materials, or equipment that becomes damaged prior to Final Acceptance.

E. The Contractor shall make a detailed inspection of the work area and adjoining construction prior to beginning installation of any materials or equipment. Verify governing dimensions and other permissible dimensional tolerances. The Contractor shall report in writing to the Owner's representative unsatisfactory conditions encountered; do not begin installation until conditions are correct. Beginning installation signifies acceptance of conditions.

3.6 EXCAVATION AND BACKFILL

A. Prior to any excavation, the Contractor shall have all utilities marked. The Contractor shall perform all excavation of every description required in the execution of his work. Excavation shall be through whatever substance encountered, to the depths indicated on the Drawings, or as required. Contractor shall hand dig wherever necessary to prevent damage to existing utilities. Excavated material suitable for backfill shall be piled in an orderly manner a sufficient distance from the trench to prevent overloading sides and cave-ins. Excavated materials not suitable for backfill shall be removed from the site or stored as directed. Grading shall be done to protect the excavation from surface water. Trenches shall be maintained in a dry condition by bailing, pumping, or other approved methods. Pipe shall not be laid in wet trenches. Sheeting and shoring shall be provided as required for the protection of the work and the safety of personnel.

B. Trenches shall be of the necessary width and depth to provide for proper installation of pipe and appurtenances, with banks as nearly vertical as possible. Bottoms of trenches shall be excavated to the grade and depth indicated or required, and barrel of pipe shall be laid on a minimum 12-inch sand bed. Bell holes, of a size to permit proper make-up of grading, shall be provided as required. Existing underground piping shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired to the satisfaction of the Owner's representative, at the Contractor's expense. Provide 3,000 pound concrete of 3" minimum enclosure around lines that cross electrical utility lines or telephone cables.

C. Trenches shall not be backfilled until all required tests have been performed. This requirement does not preclude sectional testing and backfilling of the various systems. Trenches shall be carefully backfilled with approved sand, free from large earth clods, rocks, and/or foreign materials, laid in 6" layers, moistened thoroughly, and carefully rammed to an elevation of one foot above top of pipe. The remainder of the backfill to finish grade shall be placed in one-foot layers soaked with water, and well tamped. Under roadways, backfill to bottom of road bed material with sand only. Where settlement occurs, trenches shall be re-opened to depth required for proper compaction, re-filled, and compacted.

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D. Open trenches abutting foundation or basement excavations, building walls, and grade beams, will not be permitted, but shall be backfilled and completed, for a distance of not less than 10’ from the above features, as soon as possible. All damage resulting from flooding or other stresses due to open trenches shall be paid for by the Contractor.

E. Where excavation requires, existing walks, street, drives, or other existing pavement to be cut to install new lines and to make new connections to existing lines, the size of the cut shall be held to a minimum, consistent with the work to be accomplished. After the installation of the new materials is completed and the excavation has been backfilled, the paving shall be patched, using materials to match those cut out. The patches shall be thoroughly bound with the original surfaces, and shall be level with them.

F. All excavation shall conform to the laws of the State of Texas and shall be done in conformance with all applicable OSHA regulations.

3.7 CUTTING AND PATCHING

A. This Contractor shall do all necessary cutting and drilling of present walls, floor, ceilings, etc. for the installation of new work or for modifications to the existing work, but no structural work shall be cut unless specifically approved by the Owner's representative. Patching and painting of surfaces as required shall be by the Contractor, unless specified hereinafter.

B. Cutting and patching or repairing of work in place, made necessary by the negligence of the Contractor or anyone employed by him, shall be paid for by the Contractor.

C. All cutting and patching shall be coordinated with the Architect prior to proceeding.

3.8 OUTAGES

A. Outages of services as required by the project will be permitted, but only at a time approved by the Owner. The Contractor shall notify the Owner in writing two weeks in advance of the requested outage in order to schedule required outages. No outages shall be taken unless written approval has first been received from the Owner. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the Contract amount.

3.9 CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

A. The Plumbing Division shall provide all plumbing connections to equipment furnished by other Divisions or the Owner that require service connections and/or ductwork.
   1. The Plumbing Division shall furnish materials and labor required for the connection of equipment except where indicated on Drawings as furnished by others.

B. The respective supplier shall furnish proper roughing-in diagrams for the installation of these items. All items shall be roughed-in and connected in strict accordance therewith.

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3.10 INSPECTIONS

A. Contractor shall arrange for all inspections required by local building officials and state agencies. Correct deficiencies required to comply with codes and standards and to receive certificate of occupancy. Upon completion of this project, submit written evidence of compliance with the above to Owner's representative. Final acceptance will not be issued and the warranty date will not be established until such compliance is demonstrated.

3.11 SYSTEMS START-UP

A. Upon completion of the installation of the work, start-up all plumbing systems and test, balance and adjust systems until they are fully operational and functioning as intended by Engineer.

3.12 FINAL CONSTRUCTION REVIEW

A. Schedule: Upon completion of the Contract, there shall be a final construction review of the completed installation. Prior to this walk through, all work under this Division shall have been completed, tested, balanced and adjusted in final operating condition and the test report shall have been submitted to and approved by the Owner's representative.

B. Personnel: A qualified person representing the Contractor must be present at this final construction review to demonstrate the system and prove the performance of the equipment.

3.13 CERTIFICATIONS

A. Before receiving final payment, the Contractor shall certify that all equipment furnished and all work done is in compliance with all applicable codes mentioned in these Specifications and with manufacturer's requirements.

B. Certification is specifically required from the following:
   1. Leak test of all renovated and new draining systems.
   2. Pressure test of all renovated and new pressure piping systems.
   3. Sterilization of all renovated and new water piping systems.
   4. Equipment performance tests.

END OF SECTION 22 05 00

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SECTION 22 05 16 – PLUMBING PIPING EXPANSION COMPENSATION

PART 1 - GENERAL

1.1 SUMMARY

A. Provide flexible connection for plumbing piping system and expansion compensation for plumbing systems.

1.2 REFERENCES

A. Conform to Standards of Expansion Joint Manufacturer’s Association.

1.3 SUBMITTALS

A. Section 22 05 00 – Plumbing General Conditions.

B. Product Data:
   1. Submit:
      a. Flexible Pipe Connectors: Indicate maximum temperature and pressure rating, face-to-face length and live length.
      b. Expansion Joints: Indicate maximum temperature and pressure rating, and maximum expansion compensation.

C. Manufacturer's Installation Instructions.

1.4 DELIVERY AND STORAGE

A. Accept expansion joints on site in factory packing with shipping bars and positioning devices intact. Inspect for damage.

B. Protect equipment from exposure by leaving factory coverings, pipe end protection, and packaging in place until installation.

PART 2 - PRODUCTS

2.1 CONNECTIONS

A. Provide flexible pipe connections and expansion joints suitable to connect to adjoining piping for pipe joints.

B. Use pipe sized units.

C. Provide connectors compatible with operating temperatures and pressures at installation point.

2.2 FLEXIBLE CONNECTORS

A. Bronze inner hose and braided exterior sleeve.

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B. Between Equipment and Piping 2 In. and Smaller: Steel or bronze end fittings, screwed, with NPT threads.

C. Between Equipment and Piping 2-1/2 In. and Larger: Plate steel flanged end fittings, 150 lb. Drilled for bolting to piping flanges.

D. Use connectors suitable for minimum 125 psi WSP and 450°F.

E. Acceptable Manufacturers:
1. Hyspan.
2. Metraflex.
3. Advanced Thermal Systems.
4. Anaconda Metal Hose.
5. Flexonics Division.
6. U.S. Flexible Metallic Tubing.

2.3 EXPANSION JOINTS

A. Steel Piping: Stainless steel bellows type with anti-torque device, limit stops, and internal guide.

B. Copper Piping: All bronze type with 2-ply bronze bellows, anti-torque device limit stops, internal guides and solder joint end.

C. Copper or Steel Piping 2 In. and Under: Low pressure compensators with 2-ply bronze bellows suitable for minimum 75 psi pressure and 250°F and maximum 1/2 in. expansion.

D. DWV PVC 4 In. and Under (under-ground or within crawl space): Non pressurized piping, Approved for vertical installations, service temperature rated at 140F, use approved PVC primer and solvent cement to make PVC joints.

E. DWV PVC 8 In. to 3 In. (under-ground or within crawl space): Non pressurized piping, Approved for horizontal installations, service temperature rated at 140F, use approved PVC primer and solvent cement to make PVC joints.

F. Acceptable Manufacturers:
1. Spears.
2. Flexonics Division.
3. Metraflex Co.
4. Canplas Industries.
5. EBAA Iron Flex-Tend.
6. EBAA Iron Ex-Tend.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install work in accordance with Manufacturer’s instructions.

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B. Provide loops, pipe offsets, and swing joints, or expansion joints where required and as indicated.

C. Install expansion compensation and anchors to permit movement at all building expansion joints.

D. Install flexible pipe connectors on pipes connected to equipment supported by vibration isolation. Install one (1) end immediately adjacent to isolated equipment and anchor other end.

E. Rigidly anchor pipe to building structure; provide pipe guides so that movement takes place along axis of pipe only.

F. Provide support and equipment required for controlling expansion and contraction of piping. Provide loops, pipe offsets, and swing joints, or expansion joints where required or as indicated on Drawings.

G. Provide swing joints in natural gas piping on building entrance risers and pressure regulators.

3.2 MANUFACTURER'S FIELD SERVICES

A. Furnish inspection services by flexible pipe manufacturer's representative for final installation and certify installation is in accordance with manufacturer's recommendations and connectors are performing satisfactorily.

END OF SECTION 22 05 16

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SECTION 22 05 29 - HANGERS, SUPPORTS, AND FOUNDATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes pipe and equipment supports, hangers, flashings, curbs, equipment bases, foundations, sleeves, and sealing of work to adjacent construction.

1.2 SUBMITTALS

A. Section 22 05 00 – Plumbing General Conditions: Submittals.

B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.

C. Product Data: Submit manufacturers catalog data including load capacity.

D. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Manufacturer's Installation Instructions: Submit special procedures and assembly of components.

1.3 QUALITY ASSURANCE

A. Perform work in accordance with code for piping support and in conformance with NFPA 13 and 14 for support of sprinkler piping and standpipes.

B. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
1. Elcen.
2. Midland-Ross.
3. Michigan Hanger Co.
4. Sioux Chief.
5. ITT Grinnell.
6. B-Line.
7. Lee Composites.
8. HoldRite.
9. Substitutions: Section -22 05 00 – Plumbing General Conditions.

B. Plumbing Piping – DWV and Storm Drainage:
1. Conform to ASME B31.9 ASTM F708.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron or carbon steel, adjustable swivel, split ring.

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3. Hangers for Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis.
4. Hangers for Pipe Sizes 2 inches and Over located within wet areas or unconditioned spaces: 316 Stainless Steel, adjustable, clevis.
5. Hangers for Pipe Sizes 2 inches and Over located within wet areas or unconditioned spaces: Galvanized steel, adjustable, clevis.
6. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
7. Multiple or Trapeze Hangers located within wet areas or unconditioned spaces: 316 Stainless Steel channels with welded spacers and stainless-steel hanger rods.
8. Wall Support for Pipe Sizes to 3 inches: Pipe clamps and channel bracing secured to wall framing.
9. Wall Support for Pipe Sizes to 4 inches and over: Welded steel bracket and wrought steel clamp.
10. Vertical Support: Steel riser clamp.
11. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
12. Copper Pipe Support: Copper-plated, carbon-steel adjustable, ring.
13. Piping Concealed in Stud Walls: Galvanized steel or copper plated stud brackets.

C. Plumbing Piping - Water:
1. Conform to ASME B31.9 ASTM F708.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron or carbon steel, adjustable swivel, split ring, and coated for non-insulated copper piping.
3. Hangers for Pipe Sizes 1/2 to 4 inches located within wet areas: PVC hanger with fiberglass threaded rod and hex nut.
4. Hangers for Pipe Sizes 1/2 to 4 inches located within wet areas: 316 Stainless Steel, adjustable, clevis. 316 Stainless Steel, adjustable, clevis with insulation coupling.
5. Hangers for Cold Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis, and coated for non-insulated copper piping.
6. Hangers for Hot Pipe Sizes 2 to 4 inches: Carbon steel, adjustable, clevis with insulation coupling.
7. Hangers for Pipe Sizes 2 inches and Over located within wet areas or unconditioned spaces: Hot Dipped Galvanized steel, adjustable, clevis.
8. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
9. Wall Support for Pipe Sizes to 3 inches: Pipe clamps and channel bracing secured to wall framing.
10. Wall Support for Insulated Water Pipe Sizes to 3 inches: Pipe clamps with insulation coupling and channel bracing secured to wall framing.
11. Vertical Support: Steel riser clamp.
12. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
13. Floor Support for Hot Pipe Sizes to 4 inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
14. Copper Pipe Support: Copper-plated, carbon-steel ring.
15. Copper Piping Concealed in Stud Walls: Copper plated stud brackets.

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2.2 ACCESSORIES

A. Hanger Rods: Hot dipped galvanized mild steel threaded both ends, threaded on one end, or continuous threaded.

B. Hanger Rods (wet or unconditioned areas): 316 stainless steel threaded both ends, threaded on one end, or continuous threaded.

2.3 PROTECTION OF HANGERS

A. Steel hangers, hanger rod and appurtenances located in crawl spaces, ventilated mechanical rooms, unconditioned attics or exposed to outdoors shall be 316 Stainless Steel / Hot Dipped Galvanized.
   1. As an alternate method, components such as rollers, chairs, pipe stands, steel supports, etc., may be primed with PPG or equal Inhibitor Red Primer 6-208, and painted with two (2) coats of PPG or equal Enamel 54 Line.
   2. All surfaces to be painted shall be free of dust, rust, scale, grease, or other foreign material, and shall be dry at time of painting.

2.4 INSERTS

A. Manufacturers:
   1. ITT Grinnell.
   2. Midland-Ross.
   3. Elcen.
   4. B-Line.
   5. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

C. Inserts (wet or unconditioned areas): Stainless steel case of stainless-steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.5 FLASHING

A. Metal Flashing: 26 gage thick galvanized steel.

B. Metal Counterflashing: 22 gage thick galvanized steel.

C. Lead Flashing:
   1. Waterproofing: 5 lb./sq. ft sheet lead.
   2. Soundproofing: 1 lb./sq. ft sheet lead.

D. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.

E. Caps: Steel, 22-gage minimum; 16 gage at fire resistant elements.

F. Plumbing Vents through Roof (VTR): Refer to Part 3 Execution, Flashing.

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2.6 SLEEVES

A. Manufacturers:
   1. Pro Set.
   2. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. Sleeves for Pipes through Non-fire Rated Floors: 18 gage thick galvanized steel.

C. Sleeves for Pipes through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.

D. Sleeves for Pipes through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed.

E. Sealant: Acrylic in non-fire rated application.

F. Where approved by Engineer prior to installation, at floor penetration of slab on grade construction, flexible foam pipe wrap such as “Flex-Wrap” by Cal-Western may be substituted for sleeve and should be wrapped a minimum of 3 times.

G. Cover trap primer piping embedded in concrete floors and walls with “Poly-Sleeve” or equal polyethylene sleeve material.

2.7 FIRE STOP SYSTEMS

A. Manufacturers:
   1. 3m Model 2000.
   2. Spec Seal Model 100.
   3. Hilti.
   4. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. General Purpose Fire Stopping Sealant: Water based non-slumping, premixed sealant with intumescent properties, rated for 3 hours in accordance with ASTM E814 and UL 1479.

C. General Purpose Vibration Resistant Fire Stopping Sealant: Silicone based, non-slumping, premixed sealant with intumescent properties, vibration and moisture resistant, rated for 3 hours in accordance with ASTM E814 and UL 1479.

D. Plastic Pipe Systems Fire Stopping Sealant: Silicone based, premixed sealant with intumescent properties, vibration and moisture resistant, rated for 3 hours in accordance with ASTM E814 and UL 1479 with metal collars.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Install cast iron piping in accordance with CISPI Standards.

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3.2 INSERTS

A. Install inserts for placement in concrete forms.

B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.3 PIPE HANGERS AND SUPPORTS

A. Piping systems shall be installed so as to be freely floating. They shall be securely supported from structure but shall be able to expand and contract independently of structure without causing undue stress or damage to the piping system. Piping shall not support itself. Piping systems shall be rigidly attached to structure only were shown on plans, as required by Specifications and codes, or as required for proper installation of equipment or fixtures. Provide sleeves, rollers, expansion fittings, expansion loops, or special fittings as required to prevent transmission or vibration to the structure or for the proper operation of systems whether specifically shown on plans or not.

B. Install in accordance with ASME B31.9, ASTM708.

C. Support horizontal piping as scheduled.

D. Install hangers with minimum 1/2-inch space between finished covering and adjacent work.

E. Place hangers within 12 inches of each horizontal elbow.

F. Use hangers with 1-1/2 inch minimum vertical adjustment.

G. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.

H. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.

I. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

J. Support riser piping independently of connected horizontal piping.

K. Provide copper plated hangers and supports for copper piping.

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L. Design hangers for pipe movement without disengagement of supported pipe.

M. Support base of risers above ceilings with braces, blocks, rodding or other suitable method, to prevent movement of pipe or separation of joints and fittings.

N. Provide non-conducting dielectric connections wherever dissimilar metals come in contact such as between pipe and hangers or pipe and metal structure and wall studs.

O. Paint pipe and equipment supports exposed to weather with galvanizing paint or other approved method.

P. Where piping is suspended in excess of 18 inches, provide sway bracing to secure against horizontal movement.

3.4 EQUIPMENT BASES, FOUNDATIONS, PIERS, SUPPORTS, AND ATTACHMENTS

A. Provide necessary foundations, supports, pads, equipment bases and piers, as required and shown on Drawings or as required by manufacturer for equipment furnished by Mechanical Division. Materials, fixtures, and equipment shall be securely attached to the building structure. Attachments shall be strong, durable, and suitable for their intended application.

B. Provide housekeeping pads or foundations for every item of floor mounted equipment specified herein or indicated on the Drawings.

C. Provide housekeeping pads of concrete, minimum 4 inches thick and extending 6 inches beyond supported equipment. Steel members may be substituted for concrete pad where approved prior to installation, or as shown on drawings.

D. All corners of the foundations shall be neatly chamfered at a 45 degree angle.

E. After removal of the forms, the surface of the foundation shall be hand rubbed.

F. All concrete work performed by the Contractor shall conform entirely to the requirements of the General Specifications which describe this class of work.

G. Provide additional steel framing to raise equipment above housekeeping pad where necessary to properly construct equipment drains.

3.5 FLASHING

A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.

B. Flash vent and soil pipes projecting 10 inches minimum above finished roof surface with lead worked 1 inch minimum into hub, 12 inches minimum clear on sides with 24 x 24 inches sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter-flash, and seal. At metal roofs, provide dielectrically compatible flashing.

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C. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36 x 36 inch sheet size. Fasten flashing to drain clamp device.

D. Seal floor, shower and mop sink drains watertight to adjacent materials.

E. Provide acoustical lead flashing around ducts and pipes penetrating equipment rooms for sound control.

F. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

3.6 SLEEVES

A. Set sleeves in position in forms. Provide reinforcing around sleeves.

B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

C. Extend sleeves through floors 2 inches above finished floor level. Caulk sleeves.

D. Where piping penetrates floor, ceiling, or wall, close off space between pipe and adjacent work with stuffing or fire stopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

E. Install chrome plated steel escutcheons at finished surfaces.

F. **SCHEDULES**

PIPE SIZE	MAX. HANGER SPACING	DIAMETER
Inches	Feet	Inches
1/2 to 1-1/4	6.5	3/8
1-1/2 to 2	10	3/8
2-1/2 to 3	10	1/2
4 to 6	10	1/2
PVC (All Sizes)	6	3/8
C.I. Bell and Spigot (or No-Hub) And at Joints	5	1/2”

END OF SECTION 22 05 29

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SECTION 22 05 53 - PLUMBING IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes nameplates, tags, stencils, and pipe markers.

1.2 SUBMITTALS

A. Section 22 05 00 – Plumbing General Conditions: Submittal Procedures.

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.4 QUALITY ASSURANCE

A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255, UL 723.

B. Maintain one copy of each document on site.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.

PART 2 - PRODUCTS

2.1 NAMEPLATES

A. Manufacturers:
   1. Brady.
   2. Seton.
   3. LEM.
   4. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. Product Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.2 TAGS

A. Metal Tags:
   1. Manufacturers:
      a. Brady.
      b. LEM.
      c. Seton.

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d. Substitutions: Refer to Section 22 05 00 – Plumbing General Conditions.

2. Brass with stamped letters; tag size minimum 1-1/2 inches diameter with finished edges.

B. Tag Chart: Typewritten letter size list of applied tags and location in anodized aluminum frame.

2.3 PIPE MARKERS

A. Color and Lettering: Conform to ASME A13.1.

B. Plastic Pipe Markers:
1. Manufacturers:
a. Brady.
b. LEM.
c. Seton.
d. Substitutions: Refer to Section 22 05 00 – Plumbing General Conditions.
2. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.

2.4 CEILING ACRYLIC MARKERS AND CEILING TACK MARKERS

A. Manufacturers:
1. Seton.
2. Brady.
3. LEM.
4. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. Description: Acrylic ceiling markers with adhesive back. ANSI/ASME A13.1 Compliant: Colors to match industry standards.

C. Description: Steel ceiling tack with 3/4"-inch diameter color-coded head.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install identifying devices after completion of coverings and painting.

B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

C. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer.

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D. Install tags using corrosion resistant chain. Number tags consecutively by location.

E. Equipment: Identify domestic water heaters, expansion tank, air separator and other mechanical equipment with plastic nameplates. Identify pumps and other small devices with tags.

F. Identify control panels and major control components outside panels with plastic nameplates.

G. Identify valves in main and branch piping with tags.

H. Tag automatic controls, instruments, and relays. Key to control schematic.

I. Piping: Identify piping, concealed or exposed, with plastic pipe markers. Identify service and flow direction. Identify domestic hot and cold water. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

J. Provide acrylic ceiling markers to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment. ANSI/ASME A13.1 Compliant: Colors to match industry standards.

END OF SECTION 22 05 53

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SECTION 22 05 58 - ACCESS DOORS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install access doors in wall or ceiling locations as required or shown for access to valves, controls, regulating devices, water hammer arrestors, trap-primers, cleanouts, and other equipment requiring maintenance, adjustment or operation.

B. All access door locations shall be approved by the Architect prior to installation of equipment, valves, etc. requiring access.

PART 2 - PRODUCTS

2.1 NON-FIRE RATED ACCESS DOORS

A. Furnish Inryco/Milcor, Acudor, Elmdor, or equal with 16 gauge frames, 14-gauge panels and 22-gauge casing head. Provide continuous concealed hinges and flush screwdriver cam lock. Use Style K access doors for plastered surfaces, Style M for masonry or gypboard surfaces. Use Style AP for acoustical plaster ceiling, with 18-guage panel and all-galvanized construction.

2.2 FIRE RATED ACCESS DOORS

A. Furnish Inryco/Milcor, Acudor, Elmdor, or equal, UL listed, 1-1/2 hour Label “B”, access doors with 16-gauge steel frames, and 20-gauge insulated sandwich-type door panel. Provide door with continuous concealed hinge and automatic closing and latching mechanism.

2.3 FINISHED AREAS

A. Provide stainless steel access doors where located in finished areas that are accessible to the general public such as but not limited to Toilet Rooms, Offices, Corridors, and Classrooms. Coordinate final access door finish with the Architect and/or Owners Representative.

PART 3 - EXECUTION

3.1 Access doors specified in Division 22 will be installed by other Divisions. Not all required access doors are shown. Coordinate with the Contractor to locate access doors for ease of operation and maintenance of concealed equipment.

3.2 Installation shall be in accordance with the manufacturer’s printed instructions.

3.3 Access doors shall be of sufficient size to perform all necessary service and maintenance tasks.

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3.4 Coordination of access doors shall be coordinated with the Architect for final installation.

END OF SECTION 22 05 58

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SECTION 22 07 00 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulation jackets, covering, thermal insulation for piping systems including vapor retarders, jackets, and accessories.

1.2 SUBMITTALS

A. Section 22 05 00 - Plumbing General Conditions: Submittals.

B. Product Data: Submit product description, thermal characteristics, and list of materials and thickness for each service, and location.

1.3 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.

B. Applicator: Company specializing in performing work of this Section whose primary business is insulation with minimum three (3) years documented experience.

1.4 QUALITY ASSURANCE

A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255, UL 723 when installed in-doors in conditioned spaces.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

B. Maintain temperature during and after installation for minimum period of 24 hours.

1.7 REGULATORY COMPLIANCE

A. Comply with latest Department of Energy regulations and ASHRAE 90.1 Standards, International Energy Conservation Code.

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PART 2 - PRODUCTS

2.1 POLYISOCYANURATE FOAM FOR PIPING OR USE AS INSERTS (CANNOT BE USED IN RETURN AIR PLENUMS)

A. Manufacturers: Dow Trymer 2000.

B. Insulation: ASTM C591, rigid molded modified polyisocyanurate cellular plastic.
1. K Value: ASTM 518; Initial – 0.14 at 75 degrees F.; Aged 180 days – 0.19 at 75 degrees F.
2. Minimum Service Temperature: -250 degrees F.
3. Maximum Service Temperature: 300 degrees F.
4. Maximum Moisture Absorption: ASTM D2842; 2 percent by volume.
5. Moisture Vapor Transmission: 4 perm-inches.
6. Connection: Waterproof vapor barrier adhesive.
7. Vapor seal seams with suitable mastic.
8. Minimum R-Value: Refer to Part 3 Schedules.

C. Vapor Barrier Jacket:
1. ASTM C921, Factory applied, all service jacket, white kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Transmission: ASTM E96; 0.02 perm inches.
3. Secure with self-sealing longitudinal laps and butt strips, then with outward clinch expanding staples and vapor barrier finish.

D. Fittings:
1. Material and thickness to be same as adjacent pipe. Fittings to be mitered with a minimum of 3 miters per fitting. Secure with glass fabric and mastic and cover with PVC fitting covers. Vapor seal seams with suitable mastic.
2. All joint and fitting fabrication work to be out in accordance with ASTM C-585 and C-450.

E. Tie Wire: 16 gage stainless steel with twisted ends on maximum 12 inch centers. In mechanical rooms, cover wire with ASJ tape.

F. Vapor Barrier Lap Adhesive:
1. Self sealing by manufacturer.
2. Compatible with insulation.
3. Provide additional vapor seal by coating lap with Foster 30-35.

G. Fibrous Glass Fabric:
1. Manufacturers:
   a. Childers #10 CHILL-GLAS.
   b. Fosters MAST-A-FAB.
2. Cloth: Untreated: 1.6oz/sq yd weight.

H. Indoor Vapor Barrier Finish:
1. Manufacturers:
   a. Childers CP-30.
   b. Fosters 30-35.
2. Vinyl emulsion type acrylic, compatible with insulation, white color.

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I. Outdoor Vapor Barrier Finish:
   1. Manufacturers: Childers CP-21.
   2. Vinyl emulsion type acrylic, compatible with insulation, white color.

J. Insulating Cement:
   1. Manufacturers: Newell PRO-TEC KOTES Model 1MWP.
   2. ASTM C449.

K. Inserts: Provide inserts at hangers on pipe sizes 8 inches and larger.

L. May be used for inserts in piping installed indoors where insulation thickness is 1 inch or less (25/50; 1 1/2 inches and over – 25/100).

2.2 GLASS FIBER, RIGID FOR PIPING

A. Manufacturers:
   1. Johns Manville Model Microlok.
   2. Knauf Model 850 ASJ-SSL.
   3. Owens Corning Model ASJ- SSL-II.

B. Insulation: ASTM C612; rigid, noncombustible.
   1. K Value: ASTM C177 or ASTM C518, 0.24 at 75 degrees F.
   2. Maximum Service Temperature: 850 degrees F.
   3. Maximum Moisture Absorption: 0.1 percent by volume.
   4. Minimum R-value: Refer to Part 3, Schedules.

C. Vapor Barrier Jacket:
   1. ASTM C921, Factory applied all service jacket, white kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
   2. Moisture Vapor Transmission: ASTM E96; 0.02 perm inches.
   3. Secure with self-sealing longitudinal laps and butt strips, then with outward clinch expanding staples and vapor barrier finish.

D. Fittings: Material and thickness to be same as adjacent pipe. Fittings to be mitered with a minimum of 3 miters per fitting. Secure with glass fabric and mastic and cover with PVC fitting covers. Vapor seal seams with suitable mastic.

E. Vapor Barrier Lap Adhesive:
   1. Self sealing by manufacturer.
   2. Compatible with insulation.
   3. Provide additional vapor seal by coating lap with Foster 30-35.

F. Fibrous Glass Fabric:
   1. Manufacturers:
      a. Childers #10 CHILL-GLAS.
      b. Fosters MAST-A-FAB.
   2. Cloth: Untreated; 9-oz/sq yd (305-g/sq m) weight.

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G. Indoor Vapor Barrier Finish:
1. Manufacturers:
a. Childers CP-30.
b. Fosters 30-35.
2. Vinyl emulsion type acrylic, compatible with insulation, white color.

H. Outdoor Vapor Barrier Finish:
1. Manufacturers: Childers CP-21.
2. Vinyl emulsion type acrylic, compatible with insulation, white color.

I. Insulating Cement:
1. Manufacturers:
a. Newell PRO-TEC KOTES Model 1MWP.
b. ASTM C449.

J. Inserts: Provide inserts at all hangers for all pipe sizes.

2.3 CELLULAR GLASS FOR USE AS INSERT

A. Manufacturers: Pittsburg Corning Model Foam Glas.

B. Insulation: ASTM C552, Type II – pipe and tubing insulation, Class 2 - Jacketed.
1. K Value: ASTM C177 or ASTM C518, 0.33 at 75 degrees F.
2. Density: 8.0 pounds per cubic foot.

2.4 HYDROUS CALCIUM SILICATE FOR HOT WATER PIPING

A. Manufacturers: Johns Manville Model Thermo Gold 12.

B. Calcium Silicate Block and Pipe Thermal Insulation: ASTM C533, Type I Asbestos – free – for use on surfaces up to 1200 F.

1. K Value: ASTM C177 or ASTM C518, 0.42 at 300 degrees F. (0.061 at 149 degrees C.).
2. Maximum Service Temperature: 1200 degrees F. (619 degrees C.).
3. Surface Burning Characteristics: ASTM E84, Flame Spread – 0, Smoke Developed – 0.

C. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

D. Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement: ASTM C449/C449M.

2.5 ELASTOMERIC CELLULAR FOAM FOR PIPING OR EQUIPMENT

A. Manufacturers: Armstrong Model AP Armaflex.

B. Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular form: ASTM C534; Type I, Tubular form. CFC, HCFC, HFC free.
1. K Value: ASTM C177 or ASTM C518, 0.27 at 75 degrees F.
2. Minimum Service Temperature: -70 degrees F.

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3. Maximum Service Temperature: +220 degrees F.
4. Surface Burning Characteristics – Pipe Insulation: ASTM E84.
   a. 3/4 inch thickness and less: Flame Spread – 25, Smoke Developed – 50.
5. Surface Burning Characteristics – Sheet Insulation: ASTM E84.
   a. 3/4 inch thickness and less: Flame Spread – 25, Smoke Developed – 50.
   b. 1-inch thickness: Flame Spread – 25, Smoke Developed – 100.
6. Water Vapor Permeability: ASTM E-96-90, 0.10 perm-in.
7. Minimum R-Value: Refer to Part 3 Schedules.

C. Elastomeric Foam Adhesive:
1. Manufacturers:
   a. Armstrong Model 520.
   b. Substitutions: Section 22 05 00 - Plumbing General Conditions.
2. Air dried, contact adhesive, compatible with insulation.

D. Insulation Tape: Elastomeric foam tape of same material as insulation.

E. Insert Material: Compression resistant elastomeric foam material.

2.6 PLENUM WRAP

A. Manufacturers: Owens SSL II with ASJ Max Fiberglass Pipe insulation.

B. Installation of Owens SSL II with ASJ Max Fiberglass Pipe insulation shall be in strict accordance with manufacturer’s written instructions. Plenum Wrap density shall be nominal 6 pcf and have a nominal 1/2 inch thickness. The fiber blanket shall have a continuous use limit in excess of 1832°F. Flame Spread Index and Smoke Developed Index of the foil encapsulated blanket shall be <25 /<50.

C. Wrap non-metallic piping located in return air plenums with thickness as required by code.

D. Installation of Owens SSL II with ASJ Max Fiberglass Pipe insulation shall be in strict accordance with manufacturer’s written instructions. Wrap non-metallic piping located in return air plenums with materials labeled and listed as meeting the 25/50 fire rating to comply with building codes. Owens Corning SSL II with ASJ Max Fiberglass Pipe insulation fully complies with 25/50 fire ratings and Labeled Plenum Insulation Rated Over Plastic Pipe Assemblies.

2.7 JACKETS

A. PVC Plastic: Fittings in all locations, piping inside Mechanical Equipment Rooms (AHU, Water Heater Rooms), and where exposed to view in finished spaces:
1. Manufacturers:
   a. Proto Corporation Model Lo Smoke.
   b. Owens Corning Model Zeston.
   c. Owens Corning Model Ceel-Co.

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2. Jacket: ASTM C921, One-piece molded type fitting covers and sheet material, off white color, factory applied coloring to identify individual services.
   a. Minimum Service Temperature: -40 degrees F.
   b. Maximum Service Temperature: 150 degrees F.
   c. Moisture Vapor Transmission: ASTM E96; 0.002 perm inches.
   d. Maximum Flame Spread: ASTM E84; 25.
   e. Maximum Smoke Developed: ASTM E84; 50.
   f. Thickness: 20 mil.
   g. Connections: As recommended by manufacturer.
3. Covering Adhesive Mastic: Manufacturers:
   a. Great Lakes Textile, Inc. Model Polyco.
   b. Compatible with insulation.

B. Aluminum Jacket –Domestic Water Pipe and Fittings Outdoors: ASTM B209.
1. Thickness: 0.016 inch sheet.
2. Finish: Smooth.
3. Joining: Longitudinal slip joints and 2 inch laps.
4. Fittings: 0.24 inch thick die shaped fitting covers with factory attached protective liner.
5. Metal Jacket Bands: 1/2 inch wide; 0.015 inch thick aluminum.
6. Color: White.

C. Asphalt Impregnated Sheathing – Underground Valves and Piping.
1. Asphalt Impregnated Sheathing, 50 mil thickness:
   a. Manufacturers:
      1) Polyguard Insul-wrap 50.
      2) Serva-Wrap.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify piping, equipment, and ductwork have been tested before applying insulation materials.

B. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with NAIMA National Insulation Standards and Manufacturers instructions.

B. It shall be the responsibility of the contractor to ensure that an effective insulation and vapor seal is achieved on all cold surfaces which will eliminate any sweating or condensation on any cold surfaces installed by the contractor.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

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D. Insulated Pipes Conveying Fluids Below Ambient Temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, expansion joints, air separators, suction diffusers, expansion tanks and chemical feeders.
   1. Furnish factory-applied or field-applied vapor retarder jackets. Secure jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips, then with outward clinch expanding staples. Seal staple penetrations with vapor retarder mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe or as specified in Part 3 - 3.3 Schedules. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.
   3. Insulate piping components such as nipples, valve stems or other cold surfaces where condensation forms with elastomeric cellular foam tape.

E. For hot piping conveying fluids over 140 degrees F., insulate flanges and unions at equipment.

F. Insulated Pipes Conveying Fluids Above Ambient Temperature: Insulate entire piping system including fittings, valves, unions, flanges, flexible connections, expansion joints:
   1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples and pressure sensitive adhesive system on standard factory-applied jacket and butt strips.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe or as specified in Part 3 Schedules. Finish with glass cloth and adhesive or PVC fitting covers.

G. Underground Valves: Insulate valve body and flanges and cover installation with asphalt impregnated jacket.

H. Equipment Connections: Seal piping at point of connection to equipment to maintain vapor barrier.

I. Inserts and Shields:
   1. Application: Piping or Equipment 1 1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts. Length shall be 4 inches shorter than insert to allow for vapor retarding butt joints.
   3. Insert location: Between support shield and piping and under finish jacket.
   4. Insert configuration: 12 inches long for pipe sizes 1 1/2 to 6 inch, 16 inches for pipe sizes 8 and 10 inch and 22 inches for pipe sizes 12 inch and larger. Thickness and contour to match adjoining insulation; may be factory fabricated.
   5. Insert material: Cellular glass or Calcium Silicate material. Where Elastomeric Foam material is used, provide compression resistant insulating material furnished by insulation manufacturer and suitable for planned temperature range and service.

J. Elastomeric Cellular Foam Insulation – Piping:
   1. Apply adhesive at butt ends of joints and fittings.
   2. Fittings shall be mitered or template-cut in accordance with manufacturer’s instructions. Do not slide tubing over 90 degree elbows.

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3. Inserts: Provide rigid elastomeric insulation at pipe hangers for pipe sizes 1 1/2 inch and larger to prevent compression of insulation.

K. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one (1) hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to architectural for penetrations of assemblies with fire resistance rating greater than one hour.

L. Exterior Applications: Provide vapor retarder jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor retarder cement. Cover with aluminum jacket with seams located at 3 or 9 o'clock position on side of horizontal piping with overlap facing down to shed water or on bottom side of horizontal equipment.

M. Domestic Cold Water – Where piping rises up form below grade and enters building, cover entrance riser with insulation and aluminum jacketing.

N. Sanitary Waste Piping and Drains receiving HVAC Condensate: Insulate drain body, p-trap, and waste piping between drain and first major sanitary branch.

O. Sanitary Waste Piping receiving Chilled Drinking Water: Insulate p-trap and waste piping between drain and first major sanitary branch.

P. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size insulation large enough to enclose pipe and heat tracer.

Q. Factory Insulated Equipment: Do not insulate, except when indicated on Drawings, or other sections of Specifications.

R. Exposed Equipment: Locate insulation and cover seams in least visible locations.

S. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

T. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.

U. Insulated Equipment Containing Fluids Below Ambient Temperature: Insulate entire system.

V. For hot equipment containing fluids over 140 degrees F., Insulate flanges and unions with removable sections and jackets.

W. Finish insulation at supports, protrusions, and interruptions.

X. Nameplates and ASME Stamps: Bevel and seal insulation around; do not insulate over.

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Y. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

3.3 SCHEDULES

A. Provide minimum thickness or R-value as follows. Increase as necessary for compliance with local code. R-values are installed values.

B. Plumbing Systems:
1. Domestic Hot Water Supply:
   a. Rigid Glass Fiber Insulation:
      1) Pipe Size Range: All sizes.
      2) Thickness: 1 inch.
   b. Elastomeric Cellular Foam:
      1) Pipe Size Range: All sizes.
      2) Thickness: 1 inch.
2. Domestic Cold Water:
   a. Rigid Glass Fiber Insulation:
      1) All piping located outside of building envelope insulation; all piping subject to freezing; all piping within unconditioned warehouse or storage; all piping in exterior walls (regardless of building insulation envelope); water entrance riser.
      2) Thickness: 1 inch.
   b. Elastomeric Cellular Foam:
      1) All piping located outside of building envelope insulation; all piping in exterior walls (regardless of building insulation envelope); water entrance riser.
      2) Thickness: 1 inch.
3. Drains and waste piping receiving HVAC condensate and chilled drinking water (refer to 3.2):
   a. Elastomeric Cellular Foam:
      1) Pipe size Range: All sizes.
      2) Thickness: 3/4 inch.
   b. Flexible Glass Fiber Insulation:
      1) Pipe Size Range: All sizes.
      2) Thickness: 1 1/2 inch.
4. Chilled Drinking Water:
   a. Elastomeric Cellular Foam Insulation:
      1) Pipe Size Range: All sizes.
      2) Thickness: 3/4 inch.

END OF SECTION 22 07 00

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SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including the “Mechanical and Electrical Specifications (Common Conditions)”, is a part of these Plumbing Specifications.

B. Sections of the Specifications covering General Conditions and supplements are a part of the contract. Contractor shall observe all requirements thereof, insofar as they pertain to his work.

1.2 SUMMARY

A. Provide materials and installation for complete first class plumbing system, within and to five feet beyond building perimeter unless noted otherwise on Contract Drawings; Domestic Water Piping, Domestic Water Valves, Testing and other normal parts that make the systems operable, code compliant and acceptable to the authorities having jurisdiction.

B. Domestic potable cold and hot water plumbing systems shall be Type L, K Hard Drawn Copper with wrought copper and bronze fittings or Pro Press fittings by Viega.

1.3 REFERENCES

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. ASTM – American Society for Testing and Materials:
1. ASTM D2765 – Standard Test Method for Determination of Gel Content and Swell Ratio of Crosslinked Ethylene Plastics.
2. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM E119 – Standard Test Methods for Fire Tests of Building Construction and Materials.
4. ASTM A193 - Alloy-Steel and Stainless-Steel Bolting Materials for High Temperature or High-Pressure Service and Other Special Purpose Applications.
5. ASTM A312 – Seamless and Welded Austenitic Stainless-Steel Pipe.
6. ASTM A351 – Castings, Austenitic, Austenitic-Ferritic (Duplex), for pressure Containing Parts.
7. ASTM A536 – Ductile Iron Castings.
8. ASTM A743 – Castings, Iron-Chromium Nickel, Corrosion Resistant, for General Applications.

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9. ASTM A744 – Castings, Iron-Chromium Nickel, Corrosion Resistant, for Severe Applications.

D. ASSE 1061 – Performance Requirements for Push-Fit Fittings.

E. NSF/ANSI 14 – Plastic Piping System Components and Related Materials.

F. IAPMO – International Association of Plumbing and Mechanical Officials.

G. ICC – International Code Council.

H. ISO – International Organization for Standardization - ISO 9001 – Quality Management Systems – Requirements.

I. NSF International:
1. NSF/ANSI 14 – Plastic Piping System Components and Related Materials.
2. NSF/ANSI 61 – Drinking Water System Components – Health Effects.

J. Underwriters' Laboratories - ANSI/UL 263 – Standard Fire Tests of Building Construction and Materials.

K. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references: 2015 Edition of the International Plumbing Code.

1.4 SUBMITTALS

A. Section 22 05 00 - Plumbing General Conditions: Submittals.

B. Product Data: Submit data on pipe materials; pipe fittings, valves, and accessories. Submit manufacturers catalog information. Indicate valve data and ratings.

C. Manufacturer's Installation Instructions: Submit installation instructions for valves and accessories.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

E. Product Data: Submit manufacturer's Technical Manual, submittal forms, catalog cuts, brochures, specifications, and installation instructions. Submit data in sufficient detail to indicate compliance with the Contract Documents.
1. Submit manufacturer's instructions for installation.
2. Submit data for equipment, fittings, fasteners and associated items necessary for the installation of the piping and manifolds.

F. Certification:
1. Submit independent certification results for the piping systems from an accredited independent testing laboratory.
2. The design shall be approved by a professional appropriately licensed in the jurisdiction where the installation will take place, as being complete and accurate.

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3. Fittings shall be third-party as approved by the manufacturer's PEX piping system with applicable plumbing and mechanical code certifications.
4. Fittings encased behind walls or ceilings shall be certified to ASTM F2080.

G. Maintenance Instructions: Submit instructions for any maintenance required or recommended by manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of valves and equipment.

B. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.

1.6 QUALITY CONTROL

A. Manufacturer's name and pressure rating shall be permanently marked on valve body.

B. The Contractor shall notify the manufacturer's representative prior to installing any copper press fittings. The Contractor shall obtain the representative's guidance in any unfamiliar installation procedures. The manufacturer's representative of copper press fittings shall conduct periodic inspections of the installation and shall report in writing to the Contractor and Owner of any observed deviations from manufacturer's recommended installation practices.

C. Manufacturer Qualifications: Company shall have minimum three years documented experience specializing in manufacturing the products specified in this Section.

D. Installer Qualifications:
1. All installers of copper press fittings shall be trained by the fitting Manufacturer's appointed representative. Written notification of training shall be submitted to Owner prior to any installation.

1.7 QUALITY ASSURANCE

A. Material shall be certified by NSF International as complying with NSF 14, NSF 61, and ASTM F 2389 or CSA B137.11.

B. Material shall comply with manufacturers specifications.

C. Special Engineered products shall be certified by NSF International as complying with NSF 14.

1.8 DELIVERY, STORAGE, AND HANDLING

A. All materials shall be new, undamaged, and free of rust.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

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D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

E. Protect all materials that are to be installed within this project from exposure to rain, freezing temperatures and direct sunlight. EXCEPTION: Materials manufactured for exterior locations.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.11 EXTRA MATERIALS

A. Furnish two (2) packing kits for each size valve and two (2) loose keys for outside hose bibbs.

1.12 TEMPORARY CONNECTIONS

A. Plumbing contractor shall provide temporary water connection required for construction purposes.

1.13 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is specified elsewhere.
   1. Condensate drain piping from equipment furnished by the HVAC Contractor to drains provided by the Plumbing Contractor.
   2. Installation of flashing and waterproofing.
   3. Furnish and install all electrical wiring required for electric water heaters, and instantaneous hot water heaters.
   4. Splashblocks.

1.14 DISPOSAL OF EXCAVATED MATERIAL

A. Excavated materials, so far as needed and of a suitable and acceptable character, shall be piled adjacent to the excavations to be used as backfill as required. All excavated material that is unsuitable for backfilling purposes, or which is in excess of the amount required or needed to satisfactorily complete the backfill, shall be piled at a location on the site designated by the Owner.

1.15 SERVICE CONNECTIONS

A. Domestic water piping located outside lines of building shall connect to existing water piping at locations indicated on the Drawings.

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1.16 TEST OF WATER PIPING

A. Water piping shall be tested under 125 PSI hydrostatic pressure for a period of no less than twelve (12) hours. Any leaks made evident shall be repaired and the test repeated to completion.

PART 2 - PRODUCTS

2.1 WATER PIPING, BURIED OUTSIDE OF BUILDING

A. PVC Pipe:
   1. 2” through 4” pipe size – PVC Pipe: ASTM D2241 SDR 26 for not less than 150 PSI pressure rating.
      a. Fittings – Schedule 40 PVC pressure: ASTM D-2466.
      b. Joints – Pipe: solvent weld.
      c. Fittings: solvent weld.

2.2 WATER PIPING UNDER FLOOR SLAB AND TRAP-PRIMER PIPING

A. Copper Tubing: ASTM B42, Type K soft. 1 1/2" pipe size and smaller.
   1. Fittings: ASME B16.26 cast bronze.
   2. Joints: No joints allowed below slab.
   3. Pressure Water Piping: All piping below slab on grade shall be encased in a Schedule 40 PVC sleeve.

2.3 WATER PIPING, ABOVE GRADE

A. Piping Sizes ½” through 2”:
   1. Copper Tubing: ASTM B88 Type L, K, hard drawn.
   2. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze or Pro Press fittings by Viega. Copper press fittings shall have a specific design feature to guarantee that un-pressed fittings will not hold at any pressure between 15 and 85 PSIG. Press fittings from various manufacturers shall not be mixed.
   3. Joints: ASTM B32, solder, Grade 95TA.
   4. Solder shall be lead free and antimony free and shall conform to the Safe Water Drinking Act Amendments, enforceable since June 1988. Solder shall be Silverbrite 100 as manufactured by Englehard Corporation or approved equal.

B. Piping Sizes 2-1/2” through 4”:
   1. Copper Tubing: ASTM B88 Type L, K, hard drawn.
   2. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze or Pro Press fittings by Viega. Copper press fittings shall have a specific design feature to guarantee that un-pressed fittings will not hold at any pressure between 15 and 85 PSIG. Press fittings from various manufacturers shall not be mixed.
   3. Joints: ASTM B32, solder, Grade 95TA.
   4. Solder shall be lead free and antimony free and shall conform to the Safe Water Drinking Act Amendments, enforceable since June 1988. Solder shall

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be Silverbrite 100 as manufactured by Englehard Corporation or approved equal.

2.4 FLANGES, UNIONS, AND COUPLINGS

A. Pipe Size 4 inches and Under:
   1. Ferrous Pipe: Class 150 malleable iron threaded unions.
   2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.

B. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, and water impervious isolation barrier.

2.5 PIPE HANGERS AND SUPPORTS

A. Plumbing Piping: Conform to ASME B31.9 ASTM F708.

B. Refer to Section 22 05 29 – Plumbing Hangers, Supports, and Foundations.

2.6 BALL VALVES

A. Manufacturers:
   1. Stockham.
   2. Jenkins.
   3. Nibco.
   4. Crane.
   5. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. Construction, 2 inches and Smaller: Class 150, bronze, one piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder or threaded ends with union.

2.7 BALANCING VALVES

A. Self-balancing thermostatic type.

B. Listed to NSF61 & NSF372 by accredited 3rd party listing agency.

C. Valve size shall match line size.

D. Closed temperature shall be designated by the design team, specific to each project.

E. To assure design integrity, valves shall be fixed temperature to prevent field adjustment.

F. Thermostatic balancing valves shall not be installed in series with each other.

G. All valve stations shall include:
   1. Thermostatic balancing valve.
   2. Strainer.
   3. Union.
   4. Check Valve.

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5. Temperature gauge.
6. Isolation ball valves each side.

2.8 BACKFLOW PREVENTERS

A. Manufacturers:
1. Watts.
2. Powers.

B. Substitutions: Section 22 05 00 – Plumbing General Conditions.

C. Type: Series 909 Reduced Pressure Zone Assemblies prevent the reverse flow of polluted water from entering into the potable water supply due to backsiphonage and or backpressure. The assembly shall consist of a pressure differential relief valve located in a zone between two positive seating check valves. Backsiphonage protection shall include provision to admit air directly into the reduced pressure zone via a separate channel from the water discharge channel, or directly into the supply pipe via a separate vent. The assembly shall be constructed using Lead Free cast copper silicon materials. The Lead Free reduced pressure zone assembly shall comply with state codes and standards, where applicable, requiring reduced lead content. The assembly shall include two tightly closing shutoff valves before and after the assembly, test cocks and a protective strainer upstream of the No. 1 shutoff valve. The assembly (specify Model LF909 for temperatures up to 140°F (60°C)) shall meet the requirements of ASSE Standard 1013; AWWA Standard C-511-92 CSA B64.4; FCCCHR of USC Manual Section 10. Listed by IAPMO (UPC). SBCCI (Standard Plumbing code). The assembly shall be a Watts LF909QT, and shall include strainer (-S) and integrated sensor for flood detection (-FS). Backflow preventer shall be Watts LF909-FS-QT. Check with local water authorities for installation requirements. Installation height shall be 36-42” above finished floor. The backflow preventer shall be registered with the City of Corpus Christi water utility department for annual inspections.

2.9 SWING CHECK VALVES

A. Manufacturers:
1. Mission Model Duo-Chek.
2. Stockham.
3. Crane.
4. Jenkins.
5. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. Up To and Including 2 inches: Class 125, bronze body and cap, bronze swing disc with rubber seat, solder or threaded ends.

C. 2 inches and Larger: Class 125, iron body, bronze swing disc, renewable disc seal and seat, flanged ends.

2.10 SPRING LOADED CHECK VALVES

A. Manufacturers:
1. Mission.

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2. Stockham.
3. Crane.
4. Jenkins.
5. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. Class 125, iron body, bronze trim, stainless steel springs, bronze disc, Buna N seals, wafer style ends.

2.11 RELIEF VALVES

A. Manufacturers:
1. Watts.
2. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. Temperature and Pressure Relief: AGA Z21.22 certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity ASME SEC IV certified and labeled.

2.12 FIRE STOP SYSTEMS

A. Manufacturers:
1. 3M Model 2000.
2. Spec Seal Model 100.
3. Hilti.
4. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. General Purpose Fire Stopping Sealant: Water based, non-slumping, premixed sealant with intumescent properties, rated for three (3) hours in accordance with ASTM E814 and UL 1479.

2.13 UV PROTECTION

A. Where indicated on the drawings that the pipe will be exposed to direct UV light for more than 30 days, it shall be provided with a Factory applied, UV-resistant coating or alternative UV protection.

2.14 HOSE BIBBS

A. Refer to Plumbing Fixture Schedule on Drawings for specification of hose bibbs.

B. Select inlet configuration to match thickness of wall for wall hydrants.

2.15 WATER HAMMER ARRESTORS

A. Manufacturers:
1. Zurn.
2. Wade.
3. Josam.
4. Substitutions: Section 22 05 00 – Plumbing General Conditions.

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B. ANSI A1126.1; stainless steel copper construction, bellows type sized in accordance with PDI WH-201.

C. Pre-charged suitable for operation in temperature range -100 to 300 degrees F (-73 to 149 degrees C) 34 to 250 degrees F (1 to 120 degrees C) and maximum 250-psi (1700 kPa) 150 psi (1000 kPa) working pressure.

2.16 THERMOSTATIC MIXING VALVES

A. Refer to Plumbing Fixture Schedule on Drawings for specification of thermostatic mixing valves.

B. Approved Manufacturers:
1. Leonard.
2. MCC Powers.
3. Cash Acme.
4. Powers.
5. Substitutions: Section 22 05 00 – Plumbing General Conditions.

2.17 THERMOMETERS

A. Furnish and install thermometers where indicated. Thermometers shall be Trerice or equal Catalog No. BX9 industrial thermometer, 9" aluminum case, adjustable angle, brass separable socket, 30 to 240 degrees F. range.

2.18 SLEEVES

A. For pipes 4” and under and passing through partitions, walls, and floors – PVC pipe except in fire rated construction. Fire rated construction - galvanized steel pipe.

B. For pipes 4” and over and passing through partitions, walls, and floors – PVC pipe except in fire rated construction. Fire rated construction - minimum 16 gauge galvanized sheet metal.

C. Where approved by Engineer prior to installation, at floor penetration in slab on grade construction, flexible foam pipe wrap such as “Flex-Wrap” by Cal-Western may be substituted for sleeve.

D. Cover trap-primer piping embedded in concrete floors and walls with “Poly-sleeve” or equal polyethylene sleeve material.

2.19 TRAP-PRIMERS

A. Refer to Plumbing Fixture Schedule and Details on Drawings for specification of trap-primers.

2.20 UNDER COUNTER PROTECTIVE PIPE COVERS

A. Manufacturers:
1. Trubro.
2. Plumberex.

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3. McGuire (Pro Wrap).
4. Substitutions: Section 22 05 00 – Plumbing General Conditions.

B. Insulate per ADA 4.19.4 and ICC/A117.1, all exposed drainage piping including all hot and cold water valve and supplies under lavatories and / or sinks. PVC insulation material shall also meet IBC testing standards ASTM E84-07.

2.21 SUPPLY STOPS

A. Lead Free, Quarter-Turn, Chrome-plated, brass body angle stop with loose key handle, chrome-plated supply tube or stainless steel braided supply hose and chrome-plated escutcheon. McGuire Convertible II compression or sweat or as indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavate.

B. Installers shall be trained and certified to install the pipe according to the manufacturer’s guidelines.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Excavate and backfill in accordance with Architectural Specifications, and Section 22 05 00 – Plumbing General Conditions.

3.3 INSTALLATION

A. Install Work in accordance with manufacturer’s instructions.

B. Install shut-off valves located above accessible ceilings at a height and location that is readily and safely accessible to maintenance personnel from an eight-foot stepladder.

C. Install non-conducting dielectric connections wherever jointing dissimilar metals.

D. No bushings will be allowed in any piping. Copper or brass adapters shall be used for joining copper pipe to screwed valves or fittings.

E. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

F. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.

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G. Group piping whenever practical at common elevations.

H. Furnish and install compression type stops on supply piping to all fixtures including kitchen equipment and fixtures.

I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

J. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 05 29 – Plumbing Hangers, Supports, and Foundations.

K. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Architectural Division prior to installation.

L. Isolate copper piping from contact with metal wall studs or other metal structures.

M. Establish elevations of buried piping outside the building to obtain not less than three feet of cover.

N. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

O. Provide hose bib, or wall hydrant where shown on plans, at each entrance for system drain down. Valve and hose bib shall be arranged so as not to interfere with normal pedestrian traffic.

P. Hot water relief lines shall not discharge onto water entrance.

Q. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.

R. Install valves with stems upright or horizontal, not inverted.

S. Install water piping in accordance with ASME B31.9.

T. Install concrete thrust blocks at all changes in direction of underground piping.

U. Sleeve pipes passing through partitions, walls and floors. At penetrations of exterior walls, fill annular space in sleeve with non-combustible material. Caulk and seal weather-tight and vermin-tight.

V. Provide fire-stopping sealant at all piping penetrations of fire rated barriers.

W. Install potable water protection devices on plumbing lines where contamination of domestic water may occur; on make-up water lines, janitor rooms, premise isolation, irrigation systems, flush valves, interior and exterior hose bibs.

X. Pipe relief from valves, back-flow preventers and drains to nearest floor drain. Pipe relief from temperature and pressure relief valves to outdoors where possible.

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Y. Install water hammer arrestors on cold water supply piping where shown on Drawings or as required for all fast closing valves as per code.

Z. Install air chambers on hot and cold water supply piping to each fixture or group of fixtures. Fabricate same size as supply pipe or 3/4 inch minimum and minimum 18 inches long. Air chambers need not be installed where water hammer arrestors are in place.

AA. Cover water and waste piping underneath ADA compliant fixtures with protective pipe covering kits.

BB. Trench safety system shall comply with the appropriate requirements established in the Occupational Safety and Health Administration (OSHA) Safety Health Requirements, Part 1926, Subpart P, Excavation, Trenching, and Shoring.

CC. Identify piping utilizing copper press fittings with markers stating, “Press-Fit” adjacent to each content identification marker.

DD. Hot water piping main shall be installed without elbows to allow for the internal hot water return piping to be installed.

EE. Backflow Preventors:
1. Install all backflow preventors at an accessible elevation 36-42” AFF.
2. Each backflow device shall be registered with the local water utility, tested by an approved/certified provider and inspected by the local water utility.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install gate or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

D. Install globe or ball valves for throttling, bypass, or manual flow control services.

E. Provide spring loaded check valves on discharge of water pumps.

F. Provide flow controls in water circulating systems where indicated.

3.5 ERECTION TOLERANCES

A. Slope water piping minimum 0.25 percent and arrange to drain at low points.

3.6 DISINFECTING OF DOMESTIC WATER

A. Prior to starting work, verify system is complete, flushed, and clean.

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B. Verify pH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder and tablet or gas form, throughout system to obtain residual from 50 to 80 mg/L.

D. Bleed water from outlets to obtain distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. When final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual concentration is equal to incoming water or 1.0 mg/L.

H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.7 SCHEDULES

A. Metal Pipe Hanger Spacing:
   1. Pipe size: 1/2 to 1-1/4 inches:
      a. Maximum hanger spacing: 6.5 ft.
      b. Hanger rod diameter: 3/8 inch.
   2. Pipe size: 1-1/2 to 2 inches:
      a. Maximum hanger spacing: 10 ft.
      b. Hanger rod diameter: 1/2 inch.
   3. Pipe size: 2-1/2 to 4 inches:
      a. Maximum hanger spacing: 10 ft.
      b. Hanger rod diameter: 1/2 inch.

END OF SECTION 22 11 16

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SECTION 22 13 16 - SANITARY WASTE, VENT PIPING AND DRAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes pipe, fittings, connections, and equipment for sanitary sewer, vent and drain piping systems. This section also includes floor drains, and cleanouts.

1.2 SUBMITTALS

A. Section 22 05 00 – Plumbing General Conditions: Submittal procedures.

B. Product Data: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information. Indicate component sizes, rough-in requirements, service sizes, and finishes.

1.3 CLOSEOUT SUBMITTALS

A. Section 22 05 00 – Plumbing General Conditions – General Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of clean-outs.

1.4 DELIVERY, STORAGE, AND HANDLING

Section 22 05 00 – Plumbing General Conditions – Product Requirements: Product storage and handling requirements.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.6 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 SANITARY SEWER PIPING, BURIED OUTSIDE OF BUILDING OR BELOW FLOOR

A. PVC Pipe: ASTM D2665 or ASTM D3034.
   1. Fittings: PVC – DWV.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 SANITARY SEWER PIPING, BURIED OUTSIDE OF BUILDING OR BELOW FLOOR

A. PVC Pipe: ASTM D3034, SDR 26.
   1. Fittings: Pipe and fittings shall have push-on compression gasket joints in accordance with ASTM D3212.

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2. Pipe shall be integrally green in color.
3. Pipe shall have an SDR of 26 and a Pipe Stiffness of 115 psi.
4. Pipe markings shall conform with AWWA.

2.3 SANITARY SEWER PIPING AND DRAIN PIPING, ABOVE GRADE

A. PVC Pipe: ASTM D2665, Schedule 40.
   1. Fittings: PVC – DWV.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.4 PIPE HANGERS AND SUPPORTS

A. Drain, Waste, and Vent: Conform to ASME B31.9 ASTM F708.

B. Refer to Section 22 05 29 – Hangers, Supports, and Foundations.

2.5 FIRE STOP SYSTEMS

A. Manufacturers:
   1. 3M Model 2000.
   2. Spec Seal Model 100.
   3. Hilti.

B. General Purpose Fire Stopping Sealant: Water based, non-slumping, premixed sealant with intumescent properties, rated for 3 hours in accordance with ASTM E814 and UL 1479.

C. General Purpose Vibration Resistant Fire Stopping Sealant: Silicone based, non-slumping, premixed sealant with intumescent properties, vibration and moisture resistant, rated for 3 hours in accordance with ASTM E814 and UL 1479.

D. DWV Plastic Pipe Systems Fire Stopping Sealant: Silicone based, premixed sealant with intumescent properties, vibration, and moisture resistant, rated for 3 hours in accordance with ASTM E814 and UL 1479 with metal collars.

2.6 FLOOR DRAINS

A. Refer to Plumbing Fixture Schedule for specification of floor drains.

B. See Approved Manufacturers Schedule on Plans for descriptions: Substitutions: Section 22 05 00 – Plumbing General Conditions – Product Requirements.

C. Floor Drain: ANSI A1121.1; lacquered cast-iron two-piece body with double drainage flange, weep holes, reversible clamping collar, and adjustable nickel-bronze strainer.

D. Accessories: Provide strainers as indicated on Drawings.

2.7 CLEANOUTS

A. Refer to Plumbing Fixture Schedule for specification of cleanouts.

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B. See Approved Manufacturers Schedule on Plans for descriptions. Substitutions: Section 22 05 00 – Plumbing General Conditions – Product Requirements.

C. Exterior Surfaced and Unsurfaced Areas: Round cast nickel bronze access frame and non-skid cover. Cleanout to be housing style only and not directly connected.

D. Interior Finished Floor Areas: Lacquered cast iron body with polished nickel bronze scoriated top, anchor flange, reversible clamping collar, threaded top assembly, and round scored cover with gasket in service areas and round depressed cover with gasket to accept floor finish in finished floor areas.

E. Interior Finished Wall Areas: Line type with lacquered cast iron body and round epoxy coated cover with gasket, and round stainless-steel access cover secured with machine screw.

F. Interior Unfinished Accessible Areas: Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Excavate and backfill in accordance with Architectural Specifications, and Section 22 05 00 – Plumbing General Conditions.

3.2 INSTALLATION

A. Drainage Piping Installation: All horizontal drainage piping shall be installed in uniform alignment at uniform slopes with the following minimum slope requirements. Contractor shall install all piping system to meet the minimum requirement of the International Plumbing Node:

1. 2-1/2” and less: 1/4" per foot
2. 3 to 6”: 1/8” per foot
3. 8” and larger: 1/16” per foot

B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.

C. Encase exterior cleanouts in concrete flush with grade.

D. Install floor cleanouts at elevation to accommodate finished floor.

E. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

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F. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

G. Install piping to maintain headroom. Do not spread piping, conserving space.

H. Group piping whenever practical at common elevations.

I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

J. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 07 00 – Plumbing Insulation.

K. Establish elevations of buried piping outside building to provide not less than 3 ft of cover.

L. Maintain code-mandated clearances between sanitary sewer, domestic water, natural gas piping, and electrical conduit.

M. Install piping penetrating roofed areas to maintain integrity of roof assembly.

N. At vents-through-roof, provide flashing and install in accordance with Section 22 05 29 – Hangers, Supports, and Foundations.

O. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

P. Excavate and backfill in accordance with Section 22 05 00 – Plumbing General Conditions.

Q. Sanitary tees shall be installed in a vertical position only. Where installation is in the horizontal position, provide a sanitary wye and ¼ bend or combination fitting. Tapped Tees may be installed in the vertical position at drinking fountains, lavatories, or cleanouts only. Tapped crosses are prohibited except where specifically indicated on Drawings.

R. Sleeve pipes passing through partitions, walls, and floors. Where approved by Engineer prior to construction, at floor penetration in slab on grade, flexible foam wrap such as “Flex-Wrap” by Cal-Western may be substituted for sleeve.

S. Piping below slab on grade shall be hub and spigot up through the first joint above slab.

T. Coat PVC piping exposed to sunlight with ultraviolet resistant paint.

3.3 ERECTION TOLERANCES

A. Establish invert elevations, slopes for drainage to 1/4 inch per foot minimum. Maintain gradients. Where existing conditions require, 1/8 inch per foot slope may be used on 4 inch and larger pipe where approved by local code authority prior to installation.

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3.4 SCHEDULES

A. PVC Pipe Hanger Spacing:
   1. Pipe size: All.
      a. Maximum hanger spacing: 4 ft.
      b. Hanger rod diameter: 3/8 inch.

END OF SECTION 22 13 16

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SECTION 22 14 29 - ELEVATOR PIT SUMP PUMP

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes submersible elevator sump pump and accessories, where indicated on the Drawings. Each complete assembly shall consist of a sump pump, piping, exterior hose bibb, valves, switched receptacle, power and control wiring, and high water alarm system as specified and indicated on the Drawings. Switched receptacle and power and control wiring shall be provided under Division 26.

1.2 REFERENCE

A. The latest published edition of a reference shall be applicable to this project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this contract shall be applicable to this project.

C. All materials, installation, and workmanship shall comply with the applicable requirements and standards addressed within the following references:
1. ANSI/ASME A17.1 Safety Code for Elevators and Escalators.
2. Texas Department of Licensing and Regulation, Elevator Safety and Licensing Health and Safety Code.
3. 2015 Edition of the International Plumbing Code.
4. UL Listings.

1.3 SUBMITTALS

A. Section 22 05 00 – Plumbing General Conditions: Submittals.

B. Product Data: Submit data on materials, fittings, and accessories. Submit manufacturer's catalog information. Indicate component sizes, rough-in requirements, service sizes, and finishes. Indicate pump type, capacity, power requirements, certified pump curves showing pump performance characteristics with pump, and system operating point plotted. Include NPSH curve when applicable. Indicate electrical characteristics and connection requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 22 05 00 – Plumbing General Conditions.

B. Project Record Documents: Record actual locations of equipment.

C. Operation and Maintenance Data: Submit frequency of treatment required for interceptors. Include, spare parts lists, exploded assembly views for pumps and equipment.

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1.5 REGULATORY REQUIREMENTS

A. Provide certificate of compliance from authority having jurisdiction indicating approval of field acceptance tests.

1.6 QUALITY ASSURANCE

A. Install equipment in strict accordance with manufacturer's published recommendations.

B. Equipment and components shall bear UL marking.

C. Pump and controls shall fit within sump pit provided and allow space for service.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Refer to Section 22 05 00 – Plumbing General Conditions.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Refer to Section 22 05 00 – Plumbing General Conditions.

1.11 EXTRA MATERIALS

A. Furnish two (2) sets of pump seals.

PART 2 - PRODUCTS

2.1 SUBMERSIBLE SUMP PUMP AND ACCESSORIES FOR ELEVATOR PIT

A. High water alarm system shall be Liberty Pump Company Model ELV-Series or equal and shall consist of the following:
   1. Alarm enclosure and alarm beacon that meets Type 3R Standards.
   2. Pre-mounted terminal block.
   3. Test/silence switch.
   4. Sensor float control switch with pipe clamp.
   5. Feet of flexible 18 gauge, 2-conductor, water-resistant cable to be determined by model number.
   6. High impact, corrosion resistant PVC float.
   7. Hermetically sealed steel capsule with mercury-to-mercury contacts switch.

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B. Submersible sump pump shall be designed to deliver 20 GPM against head of 18 feet, 1/3 HP, 110 volt single phase, 1725 RPM. Pump shall be furnished with bronze impeller, stainless steel shaft, and integral mounted float control.

2.2 ACCEPTABLE MANUFACTURERS

A. Liberty Pump.

B. Paco.

C. Weil.

D. Little Giant.

E. Grundfos.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state, and local requirements, referenced standards, and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer's published recommendations.

C. Provide access space around pumps for service. Provide no less than minimum as recommended by manufacturer.

D. Seal all penetrations through elevator pit walls watertight.

E. Provide full line size spring loaded check valve and ¾" ball valve and bronze hose bibb adapter.

F. Install piping at locations that will not interfere with service accessibility to or operation of pump and controls.

G. Support piping to prevent movement and transmission of weight upon pump casing.

H. Coordinate with Electrical Contractor for power connections.

I. Coordinate with General Contractor for exact location and size of sump and grate.

3.2 TESTING

A. After installation of pump, controls, piping, accessories, and electrical connections, fill sump with water, connect garden hose to outlet, and perform a test to assure proper operation.

B. Test shall be witnessed by the MDACC designee.

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C. Submit verification of test results to Architect/Engineer and include within operation and maintenance manual.

END OF SECTION 22 14 29

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SECTION 22 33 00 - DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electric Water Heaters.

1.2 RELATED SECTIONS

A. Section 22 07 00 – Plumbing Insulation.

B. All divisions of Contract Documents.

1.3 REFERENCES

A. ANSI/ASHRAE 90.1 – 1999 - Energy Standard for Buildings Except Low Rise Residential Buildings.

B. ASME Section VIIID - Pressure Vessels; Boiler and Pressure Vessel Codes.

C. ANSI/NFPA 70 - National Electrical Code.

D. ANSI/UL 1453 - Electric Booster and Commercial Storage Tank Water Heaters.

E. ANSI/NEMA 250 - Enclosure for Electrical Equipment (1000 Volts Maximum).

F. International Energy Conservation Code – 2000 Edition

1.4 SUBMITTALS

A. Submit under provisions of Section 22 05 00 – Plumbing General Conditions: Submittals.

B. Shop Drawings: Include dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tappings, and drains.

C. Product Data:
1. Include dimension drawings of water heaters indicating components and connections to other equipment and piping.
2. Provide electrical characteristics and connection requirements.

D. Manufacturer's Installation Instructions.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 22 05 00 – Plumbing General Conditions.

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B. Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with State of Texas standard.

B. Ensure products and installation of specified products are in conformance with recommendations and requirements of the following organizations:
   1. National Sanitation Foundation (NSF).
   2. American Society of Mechanical Engineers (ASME).
   3. National Electrical Manufacturers' Association (NEMA).
   4. Underwriters Laboratories (UL).

1.7 REGULATORY REQUIREMENTS

A. Conform to, NSF, NBBPVI, ANSI/NFPA 54, ANSI/NFPA 58, ANSI/NFPA 70, ANSI/UL 174, and ANSI/UL 1453 requirements for water heaters.

B. Conform to ASME Section VIIID for manufacture of pressure vessels for heat exchangers.

C. Conform to ASME Section VIIID for tanks.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site.

B. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.9 WARRANTY

A. Provide three (3) year warranty under provisions of Section 22 05 00 – Plumbing General Conditions.

B. Warranty: Include coverage of domestic water heaters.

PART 2 - PRODUCTS

2.1 ELECTRIC WATER HEATERS

A. Manufacturers:
   1. Rheem / Ruud.
   2. Other acceptable manufacturers offering equivalent products.
      a. State.
      b. A.O. Smith.

B. Type: Automatic, electric, vertical storage water heater with T&P valve, auxiliary drain pan.

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C. Tank: Glass lined welded steel, thermally insulated with 2 inches thick glass fiber; encased in corrosion-resistant steel jacket; baked-on enamel finish.

D. Controls: Automatic water thermostat with externally adjustable temperature range from 120 to 170 degrees F. (49 to 77 degrees C.), flanged or screw-in ni-chrome elements, enclosed controls and electrical junction box.

E. Accessories: Brass water connections and dip tube, drain valve, high-density magnesium anode, ASME temperature and pressure relief valve, platform and auxiliary drain pan.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate work of this Section with other affected work.

B. Verify that electrical power is available and of the correct characteristics.

3.2 WATER HEATER INSTALLATION

A. Install water heaters in accordance with manufacturer's instructions and to NSF, ANSI/NFPA 54, UL requirements.

B. Coordinate with plumbing piping and electrical work to achieve operating system.

C. Provide all interconnecting electrical wiring necessary for the proper operation of water heaters except as shown in contract documents to be furnished by other divisions.

D. Provide steel pipe support for tanks, independent of building structural framing members.

E. Clean and flush tank after installation. Seal until pipe connections are made.

F. Provide heat traps on inlet and outlet piping in accordance with ASHRAE 90.1 –1999 and IECC – 2000 if internal heat traps are not utilized.

END OF SECTION 22 33 00

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SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Water Closets.

B. Urinals.

C. Lavatories.

D. Sinks.

E. Mop Basins.

F. Hose Bibbs.

G. Drinking Fountains.

H. Electric Water Coolers.

I. Flush Valves.

J. Carriers.

1.2 RELATED SECTIONS

A. Section 22 05 29 – Hangers, Supports, and Foundations.

B. Section 22 11 16 – Domestic Water Piping.

C. Section 22 13 16 – Sanitary Waste, Vent Piping and Drain Piping.

D. Section 01010 – Summary of Work: Product requirements for Owner furnished fixtures.

1.3 REFERENCES

A. ASME A112.6.1 - Supports for Off-the-Floor Plumbing Fixtures for Public Use.

B. ASME A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.

C. ASME A112.19.2 - Vitreous China Plumbing Fixtures.

D. ASME A112.19.5 - Trim for Water-Closet Bowls, Tanks, and Urinals.

E. NFPA 70 - National Electrical Code.

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1.4 SUBMITTALS FOR REVIEW

A. Section 22 05 00 – Plumbing General Conditions: Submittals.

B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

1.5 SUBMITTALS FOR INFORMATION

A. Section 22 05 00 – Plumbing General Conditions: Submittals.

B. Manufacturer's Instructions: Indicate installation methods and procedures.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

A. Maintenance Data: Include fixture trim exploded view and replacement parts lists.

B. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this Section with minimum three (3) years documented experience.

1.8 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

1.9 DELIVERY, STORAGE, AND PROTECTION

A. Transport, handle, store, and protect products.

B. Accept fixtures on site in factory packaging. Inspect for damage.

C. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.10 CONNECTIONS AND SERVICES TO EQUIPMENT SPECIFIED ELSEWHERE

A. Certain fixtures and equipment, indicated on Drawings with an asterisk, will be furnished by Owner and / or General Contractor which will require rough-in and final connections by the Plumbing Contractor.

B. Prior to rough-in for fixtures and equipment, Plumbing Contractor shall obtain certified rough-in prints of fixtures and equipment. Plumbing Contractor shall verify that these

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prints have been checked by the Architect and have been approved by the Architect. No rough-in shall be done by Plumbing Contractor until certified prints are obtained.

C. Equipment and fixtures such as demonstration desks shall be furnished complete with faucets and drains with tailpieces. Traps for laboratory equipment shall be furnished and installed by the Plumbing Contractor. Faucets for the demonstration desks will be provided loose with the equipment for installation by the Plumbing Contractor. Equipment and fixtures will be received, uncrated, set in place, and leveled by the contractor furnishing the equipment and fixtures.

D. Plumbing Contractor shall furnish and install the following for the fixtures and equipment: water and waste piping, install shut-off valves on water piping at each piece of equipment requiring water, furnish and install all pipe fittings required, furnish and install traps, and make final connections.

1.11 RELATED WORK SPECIFIED ELSEWHERE

A. The following related work is specified elsewhere:
1. Condensate drain piping from equipment furnished by the HVAC Contractor to indirect waste drains and floor drains provided by the Plumbing Contractor.
2. Installation of flashing and waterproofing.
3. Electrical wiring required for electric water heaters.
4. Installation of access panels if any access panels are required.
5. Power wiring to the elevator alarm panel.

PART 2 - PRODUCTS

2.1 GENERAL

A. See Plumbing Fixture Schedule on Plans for descriptions.

B. Acceptable Manufacturers:
1. Water Closets: American Standard, Kohler, Sloan.
2. Urinals: American Standard, Kohler, Sloan.
3. Lavatories: American Standard, Kohler, Sloan.
4. Mop Basin: Oberon, Fiat, Crane.
5. Drinking Fountains: Elkay, Halsey Taylor, Haws.
6. Hydrants: Woodford, Watts, Zurn, Chicago, J.R. Smith.
7. Flush Valves: Sloan, Zurn, Moen, American Standard.
8. Carriers: Zurn, Josam, Watts, J.R. Smith, Wade.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

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C. Verify that electric power is available and of the correct characteristics.

D. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

B. Coordinate work of this Section with other affected work.

3.3 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.

C. Install components level and plumb.

D. Install and secure fixtures in place with wall carriers and bolts.

E. Seal fixtures to wall and floor surfaces with sealant, color to match fixture.

F. Solidly attach water closets to floor with lag screws. Lead flashing is not intended to hold fixture in place.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

A. Clean plumbing fixtures and equipment.

3.7 PROTECTION OF FINISHED WORK

A. Do not permit use of fixtures.

END OF SECTION 22 40 00

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SECTION 23 05 00 - MECHANICAL GENERAL CONDITIONS

PART 1 - GENERAL

1.1 SCOPE

A. The Work to be provided under this Division of Specification shall include the furnishing, delivering, transporting, unloading, hoisting, handling, scaffolding, storing, erecting, adjusting, and testing of all materials, apparatus, and equipment required for complete, properly adjusted and operable mechanical systems for this project in accordance with the Contract Documents. Provide all labor, supervision, coordination, equipment, tools, materials, permits, fees, and connection to utilities necessary for the completion of this Work.

B. If details or special conditions are required in addition to those shown on Drawings, provide all material and equipment usually furnished with such systems or required to complete their installation, whether noted in Contract Documents or not.

C. The Instructions to Offerors, Notice to Offerors, General Conditions, Special Conditions, all other preface Sections, all technical divisions and all appendixes of the Specifications, and any other pertinent documents issued by Owner’s representative shall be considered as part of this Division insofar as they may be applicable.

D. The Architectural, Civil, Structural, Plumbing, Fire Protection, Heating, Ventilating and Air Conditioning (HVAC) and Electrical Plans and Specifications and any other pertinent documents issued by Owner’s representative shall be considered as part of this Division insofar as they may be applicable.

E. Refer to Division 1 Specifications for general requirements of the following items:
1. Work by Owner.
2. Work sequencing and phasing.

1.2 CODES AND STANDARDS

A. The Codes and Standards of the following organizations shall generally apply where applicable and where no specific Codes and Standards have been cited. In the event of conflict between the Codes and Standards of these organizations, the more stringent shall govern.

AABC:	Associated Air Balance Council.
ABMA:	American Boiler Manufacturer's Association.
ADC:	Air Diffuser Council.
AGA:	American Gas Association.
AMCA:	Air Moving and Conditioning Association.
ANSI:	American National Standards Institute.
API:	American Petroleum Institute.
ARI:	American Refrigeration Institute.
ASA:	American Standard Association.
ASHRAE:	American Society of Heating Refrigeration and Air Conditioning Engineers.

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ASME:	American Society of Mechanical Engineers.
ASPE:	American Society of Plumbing Engineers.
ASTM:	American Society for Testing and Materials.
AWS:	American Welding Society.
AWWA:	American Water Works Association.
FM:	Factory Mutual Engineering Company.
IRI:	Industrial Risk Insurers.
ISA:	Instrument Society of America.
MSS:	Manufacturers Standardization Society.
NBS:	National Bureau of Standards.
NEC:	National Electric Code.
NEMA:	National Electrical Manufacturer's Association.
NFPA:	National Fire Protection Association.
OSHA:	Occupation Safety and Health Administration.
PDI:	Plumbing and Drainage Institute.
PFI:	Pipe Fabrication Institute.
SMACNA:	Sheet Metal and Air Conditioning Contractors National Association.
UL:	Underwriters Laboratories, Inc.

B. All workmanship, material, and equipment shall be in accordance with all local, state, and federal codes, ordinances and regulations.

1.3 DEFINITIONS

A. “Contract Documents" shall refer to the complete package of Plans, Specifications, addenda, and special conditions used as a basis for the General Construction Contract for this project including but not limited to all General and Special Conditions, all Architectural and Engineering Divisions of Specifications and all Architectural and Engineering Plans.

B. “Owner” means the entity specified in the General Construction Contract as Owner.

C. "Contractor" means the entity contracting with the Owner for the performance of work.

D. “Work” means all of the Contractor’s obligations under the Contract.

E. “Provide” shall mean furnished and installed, complete and ready for intended use by Contractor, except as otherwise noted.

F. “Furnish” shall mean purchase only by Contractor; installation by others, except as otherwise noted.

G. “Install” shall mean Contractor to set up for use, erect or construct only; purchase by others, except as otherwise noted.

H. “Demolish” and “Remove” shall mean Contractor to disassemble, take away from site, and properly dispose of items as indicated or implied. Contractor shall patch remaining systems to match existing.

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I. "Directed" means "directed by Owner’s representative”. This shall not imply that Architect's or Engineer's responsibility extends into the Contractor's area of construction supervision.

J. Where the words "similar" or "typical" are used, they shall be used in their general sense and shall not be interpreted as meaning identical. Details shall be worked out in relation to their location and connections to other parts of work.

K. Items such as but not limited to access doors, sleeves, cleanouts, trap-primers, roof flashings, pipe supports, or balancing dampers that are to be installed repetitiously and are noted on the Plans as "typical" shall be installed at every location required by Specifications, codes, or good practice, whether specifically shown on Plans or not.

L. Where the terms "or equal" and "or approved equal" are used they shall be defined as "approved as equal by Owner’s representative".

1.4 CONTRACTOR'S RESPONSIBILITY

A. It shall be the responsibility of the Contractor to carefully examine all of the Contract Documents and to comply with them in every respect. Should there be omissions or discrepancies in the documents notify the Owner’s representative prior to the bid date so a written clarification can be issued.
   1. Coordinate exact electrical requirements of all mechanical equipment prior to submittal review and make all modifications necessary for full compatibility with the final electrical installation.

B. It shall be responsibility of the Contractor to review all Divisions of the Contract Documents with respect to mechanical work that will be required by other divisions. Contractor shall thoroughly review all aspects of Mechanical Bid Proposal prior to bidding for the purpose of clearly defining the scope of Mechanical Bid Proposal with that of all other trades.

C. It shall be the responsibility of the Contractor to provide all equipment, materials, and labor, whether specifically indicated on Plans or called for in Specifications or not, which are necessary for the proper installation and function of the mechanical systems for this project.

D. It shall be the responsibility of the Contractor to carefully examine conditions of the project site and to check the work of other divisions that might affect the mechanical work. Include all costs of demolition, cutting, patching, and repairing of existing elements in bid proposal.
   1. Visit the proposed project site prior to bid and carefully investigate existing streets, parking lots, paved areas, sidewalks, buildings, structures, and landscaping.

E. It shall be the responsibility of the Contractor to contact the Owner’s representative prior to commencement of any trenching or site utility work for assistance in locating underground utilities. Hand dig where necessary to verify depth and location and to avoid damage to existing.

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F. It shall be the responsibility of the Contractor to coordinate work performed under the Mechanical Division of the Contract Documents with work performed under other divisions so as not to delay or damage any part of this installation.

G. It shall be the responsibility of the Contractor to coordinate the location of chases, openings, sleeves, flashings, trenches, and the like required for the work covered by the Mechanical Division of the Contract Documents. Do so in sufficient time for proper coordination with general construction, or assume the responsibility for required cutting and patching. No cutting of structural members shall be performed without approval of the Owner’s representative.

H. It shall be the responsibility of the Mechanical Division to include minor details necessary for proper installation and operation of materials, equipment, or fixtures as if specified or shown in Contract Documents.

I. It shall be the responsibility of the Contractor to install materials, equipment, and fixtures according to code requirements, manufacturer's recommendations or as required in Contract Documents, whichever is more stringent.

1.5 ADDITIONAL COMPENSATION

A. Failure to examine or to comply with Contract Documents shall not relieve Contractor of responsibility for the work or be used as basis for additional compensation.

B. No additional compensation will be awarded for conflict with Architectural, Structural, Electrical, or Mechanical components in installation of prefabricated materials or equipment.
   1. Ductwork and piping shall be fabricated from field measurements. Adjust duct sizes as necessary to fit space available. Contractor shall advise Owner’s representative of any discrepancies prior to fabrication.

C. No compensation will be awarded to the Contractor for minor relocations or deviations from plans. Changes in contract price will be allowed only for additions to or changes to original design intent and then only with written approval of the Owner’s representative.

D. Omission of Architectural, Civil, Structural, Electrical, or other pertinent details from Mechanical Contract Documents shall not be used as basis for additional compensation.

E. No compensation will be awarded to the Contractor for failure to coordinate exact electrical requirements with electrical division prior to ordering equipment.

1.6 SUPERVISION, LABOR, AND WORKMANSHIP

A. Contractor shall provide proper supervision of mechanics and subcontractors performing work under this Division. Labor shall be performed by skilled mechanics experienced in their particular trade. Piping and equipment shall be installed square and plumb, with accessibility for proper operation and service. Any item that does not present a neat and workmanlike appearance shall be replaced or corrected at the direction of the Owner’s representative and without additional cost to the Owner or Design Professionals.

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B. Submit welder's certificates and resume of experience for all mechanics on this project when directed to do so by Owner's representative.

1.7 LICENSING

A. Contractor shall be licensed to perform project work in accordance with Federal, State, and Local licensing requirements as applicable. HVAC Contractor shall have minimum Texas Air Conditioning Contractor Class "A" License.

1.8 FEES AND PERMITS

A. Contractor shall obtain and pay for all fees and permits required for the completion of the Work, including but not limited to construction permits; federal, state, and local inspection fees, connections to utilities, meter and tap fees, capitalization charges, temporary service charges, and any other associated fees or charges.

1.9 PROJECT/SITE CONDITIONS

A. Install Work in locations shown on Drawings, unless prevented by Project conditions.

B. These Specifications and the accompanying Drawings are intended to describe and illustrate systems that will not interfere with the structures, which will fit into available spaces, and which will insure complete and satisfactorily operating installations. Coordinate the proper fitting of the material and apparatus into the available spaces without interfering with other building components. Prepare installation drawings at all locations where possible conflicts of HVAC, Plumbing, Fire Protection, Electrical, Structural, or Architectural components may occur. The installation drawings shall be submitted to the Owner's representative prior to commencing the Work. They should illustrate the installation of work in relation to other portions of the Work. Interferences with other portions of work, or the building structure, shall be corrected before the work proceeds. Should changes become necessary on account of failure to comply with these stipulations, make such necessary changes.

1.10 PRE-INSTALLATION CONFERENCE

A. Contractor shall convene a pre-installation conference one (1) week prior to commencing work of this Division and in conjunction with work of other divisions and notify Owner's representative of date and time of meeting.

B. Require attendance of parties directly affecting work of Division 23 and 26.

C. Review installation procedures and coordination required with related work.

D. Establish "right of way" and routes for conduit, wiring, cable trays, piping, ductwork, and similar elements in the available space above ceilings and vertical chases.

E. Coordinate exact plumbing, fire protection, electrical, and service access requirements of all HVAC equipment and fixtures. Coordinate exact HVAC and service access requirements of all plumbing, fire protection, and electrical equipment, as example, ventilation and exhaust of panelboards, transformers, generators, pumps, water heaters,

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or boilers. Advise Owner’s representative in a timely manner of any requirements that will be necessary in addition to requirements on Contract Documents.

1.11 GENERAL REQUIREMENTS

A. Protection of Rough Work: All openings of every description shall be securely capped or otherwise protected against debris or other foreign material entering the system until such time as the equipment is permanently attached.

B. Cleaning and Adjusting: At the completion of the work all parts of the installation shall be thoroughly cleaned. All valves and controls shall be adjusted for proper operation. Upon completion of the work, the Contractor shall leave the building and project site in a neat condition.

C. Defective work: If inspection or testing show defects, such defective work or materials shall be replaced and inspection and test repeated. All repairs to piping shall be made with new material. No caulking of screwed joints will be acceptable.

D. Dielectric Connection: Where dissimilar metals are connected, provide approved dielectric connector to protect against dielectric corrosion.

E. Vents Through Roof: Vents through roof shall be installed as closely as possible to locations shown on Drawings. However, in no case shall vents through roof be installed within ten feet of air conditioning outside air intakes. It shall be the responsibility of the Contractor to coordinate with the Plumbing and HVAC Divisions and offset vent piping as necessary. Offsets will be made at no additional cost to the Owner or Design Professionals.

F. Surveys and Measurements: Carefully survey project site prior to bidding and installation. Dimensions, both horizontal and vertical, shall be derived from Architectural, Civil, and Structural plans. Do not "scale" plans; that is do not measure plans with Architect's or Engineer's scale and base installation dimensions on such measurements.

G. Horizontal and vertical measurements shall be based on established benchmarks. Work shall agree with established lines and levels. Field verify measurements at project site. Check correctness of same as related to work prior to fabrication of shop made items and ordering of factory-built items.
   1. Notify Owner’s representative of discrepancies between plans and actual field conditions that will prevent the following of good practice or affect the intent of plans and Specifications. Do not proceed with installation until instructions are received from Owner’s representative.

H. The accompanying plans show diagrammatically the sizes and location of the various equipment items and the sizes of the major interconnecting piping and ductwork, without showing exact details as to elevations, offsets, control lines, and other installation details. The Contractor shall carefully lay out his work to conform to the site conditions, to avoid obstructions and provide proper grading of lines. Exact locations of outlets, apparatus, and connections thereto shall be determined by reference to the accompanying Plans, to all detail drawings, equipment drawings, rough-in drawings, etc., by measurements at the building, and in cooperation with other divisions, and in all cases shall be subject to the approval of the Owner’s representative. Minor

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relocations necessitated by the conditions at the site or directed by the Owner's representative shall be made without any additional cost to the Owner.

I. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted on the Drawings.

J. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction may be required for work indicated or specified in this Section or work specified in other Sections, it shall be the responsibility of the Contractor to provide same as well as to provide material and equipment usually furnished with such systems or required to complete the installation, whether mentioned or not.

K. Should a discrepancy exist between the mechanical Drawings and the mechanical Specifications it is the Contractor's responsibility to include that portion or portions of the more expensive item in bid proposal. Final approval and/or directive can then be forwarded to the Contractor during the submittal process.

1.12 FIXTURE AND EQUIPMENT SIZES AND REQUIREMENTS

A. Space allocations in machinery spaces are based on equipment scheduled in each case. Should the Contractor offer equipment of another make that requires more space in any critical dimension, the Contractor shall submit, together with other submittal data on the equipment, prints of drawings indicating how the equipment may be installed, indicating room for servicing and revisions in piping or ducting and any other details necessary for the Owner's representative to form a judgment as to the suitability of the substitute material, as to performance, suitability for the space and other variables.

B. Duties of certain equipment items, horsepower of driving motors and electrical characteristics are scheduled for equipment items of a particular make in each case. Should any substitute material be accepted which has other requirements that would involve allied equipment or the work of others, the Contractor shall be responsible for all modifications required at no change in contract price. As examples:
1. If an accepted A/C Unit has a brake horsepower requirement above the motor horsepower scheduled, the Contractor shall be responsible for providing a larger motor and heavier drive and any change in size of the protective device, conduit run, and conductors serving that motor. The latter shall be extended through an individual branch protective device and branch circuit on through the panel, feeder, feeder protective device, etc.
2. If accepted heat exchangers, coils, etc. have greater pressure drops than those on which pumping heads were based, the Contractor shall be responsible for selecting proper pumps and drive and adjusting the electrical work as required.

C. Structural steel members are indicated to provide supports for certain specific sizes and weights of equipment. Should other equipment be offered, the spacing of the supports shall be varied to suit the equipment. Should the weight or size of a substituted item of equipment require additional supporting steel members, the Contractor shall be required to provide and install them at no change in contract price.

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1.13 INTERFACE WITH OTHER PRODUCTS

A. Review millwork shop drawings. Confirm location and size of equipment and openings before ordering equipment, roughing-in, and installation.

1.14 SUBMITTALS

A. Refer to Section 23 05 05 Submittal Procedures.

1.15 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Refer to Section 23 05 05 Submittal Procedures.

1.16 UTILITIES

A. The Contract Documents reflect the general location, size, and manner of routing for all utilities known to be required on this project. It shall be the responsibility of the Contractor to visit the site, meet with the local Utility Company personnel in order to coordinate and confirm the exact requirements for all utilities. The bid submitted by the Contractor shall include costs for all such coordination work as well as any and all utility company charges and/or fees.

1.17 BUILDING CONSTRUCTION AND LAYOUT OF WORK

A. The Contract Documents are diagrammatic in character and cannot show every connection in detail or every line or conduit its exact location. These details are subject to the requirements of ordinances and also Structural and Architectural conditions. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases unless specifically noted or indicated to be exposed. Work shall be installed to avoid crippling of structural members; therefore, inserts to accommodate hangers shall be set before concrete is poured, and proper openings through floor, walls, beams, etc. shall be provided as hereinafter specified or as otherwise indicated or required before concrete is poured. All work shall be run parallel or perpendicular to the lines of the building unless otherwise noted.

1.18 RECORD DRAWINGS

A. As part of the required mechanical work, a complete set of record drawings shall be made up and delivered to the Owner's representative.

B. The drawings shall reflect the following:
   1. All mechanical work installed exactly in accordance with the original design.
   2. All mechanical work installed as a modification or addition to the original design.
   3. The dimensional information necessary to delineate the exact location of all ductwork and piping runs which are so concealed as to be untraceable by inspection through the regular means of access established for inspection and maintenance. Where shop drawings have been prepared and approved, the

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record drawings shall be cross-referenced to the respective shop drawings. In this case dimensions need not be shown on the record drawings.

C. Record drawings shall include the updating of all equipment schedules.

D. The record drawings shall be of a reproducible type as directed.

1.19 WARRANTY

A. All materials and equipment, to be furnished and installed under this Division of the Specifications shall be warranted to meet the specified performance requirements and to be free of defects in materials and workmanship for a period of one year after official date of Substantial Completion. The Contractor to the complete satisfaction of the Owner's representative shall remedy deficiencies caused by other than normal usage, without cost to the Owner or Design Professionals.

B. If there is any indication that the equipment does not meet the specified quantities, the Contractor shall, at his expense, institute a program to demonstrate the adequacy of the installation. This program shall include all necessary testing and testing equipment. Should the Contractor not have the equipment or technical skill to perform the tests, it shall be his responsibility to employ recognized experts to perform the tests and shall provide certified laboratory tests, certified factory reports and work sheets, or other certified data to support results of any tests required.

C. Equipment warranties extending beyond the first-year warranty generally include material only guarantees except where required by specific reference (i.e. chiller). Owner is responsible for additional expenses and the assembly of adequate record keeping during warranty period.

1.20 BILLINGS

A. Contractor shall provide a schedule of values of the mechanical work with each payment application. Provide a line item for labor and materials for each section of specifications. Provide additional breakdown were requested by Owner's Representative.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Coordinate exact electrical requirements of mechanical equipment prior to submittal and purchase. Equipment that is not compatible with electrical installation will be removed and replaced at no expense to the Owner or Design Professionals.

2.2 MATERIALS

A. Unless otherwise specified, provide only new, first grade equipment and materials that comply with requirements of this Specification and applicable Standards.

B. Furnish, if required, satisfactory evidence of kind and quality of materials proposed for use.

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C. Similar items of material and equipment shall be product of same manufacturer.

2.3 ACCEPTABLE MANUFACTURERS AND SUBSTITUTIONS

A. The Contract Documents (Drawings and Specifications) indicate a standard of quality for materials and equipment. Manufacturers' names and model numbers are used within the Contract Documents to establish the standard of quality. The manufacturers and products designated in schedules or notes on Drawings are used as the basis of the engineering design of mechanical systems. In addition to those scheduled or noted on Drawings, other manufacturers and products that are acceptable for use on this project are listed within the Specifications. Such listed manufacturers do not require a submittal for approval prior to bid. Contractor's bid proposal may be based on any of these manufacturers and products provided they are in compliance with all criteria set forth within Section 2.3.

B. Contractor is responsible for all coordination and additional costs which may be required for the work to be completed on time with no additional cost to the Owner or Design Professionals.
   1. Costs of architectural, structural, electrical, plumbing, fire protection and HVAC modifications associated with listed manufacturers shall be included in bid proposal.

C. Contractor to verify during submittal that the product works dimensionally within the intent of the design.
   1. The ability to service components shall not be compromised.

D. Any additional coordination due to interference with other elements of the project will be the responsibility of the Contractor with no additional cost to the Owner or Design Professionals.

E. Substitutions:
   1. Manufacturers of unlisted products will be considered as substitutions only if submitted at least five (5) working days prior to the bid date and when in compliance with all criteria set forth within Section 2.03.
   2. It is fully the Contractor's responsibility to assemble and submit sufficient technical information to fully illustrate that the material or equipment proposed for substitution is equal or superior as the Architect or Engineer is under no obligation to perform the service for the Contractor. The proposal shall be accompanied by manufacturer's complete engineering data, specification sheet, and a sample, if practical or if requested. In no event shall a proposal for substitution be cause for delay of work.
   3. Substitutions and deviations shall be clearly marked, indicated, or otherwise called to attention of the Owner's representative in the submittal documents. Failure to indicate substituted materials and/or equipment or deviations from Contract Documents shall be construed as a representation that contractual obligations have not been meet and the submittal shall be rejected without further review.
   4. Engineer reserves the right to accept or reject proposed substitutions and it is understood that his judgment shall be final.

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2.4 MOTOR CONTROLLERS AND ELECTRIC INTERLOCKS

A. Except where otherwise specified or as included as an integral part of the normal and customary mechanical equipment, each starter shall be furnished by other divisions complete with the required control power transformers and auxiliary contacts necessary for control interlocks and wired by a licensed electrician in accordance to governing codes.

B. In Fractional horsepower 120v single-phase roof or wall mounted fans, a motor rated manual starter/disconnect with on-off snap switch type with soldered ratchet overload protection shall be furnished by the Contractor furnishing the fans and wired by a licensed electrician in accordance to governing codes.

C. When interlocking of equipment is required all wiring in excess of 50 volts to be provided by a licensed master electrician and coordinated by the Contractor. All other wiring 50 volts or less or as required by the controls/energy management system shall be fully coordinated by the Contractor to provide and assure a complete and fully operational system. All raceways for controls and or power wiring shall be in accordance with Division 26 requirements, and installed by licensed electrician and coordinated by the Contractor.

D. Except for such items that are normally wired up to their point of manufacture and so delivered and unless specifically noted to the contrary herein, the Contractor shall do all electric wiring of every character for interlocking, pilot, and control in accordance with methods and materials described within Division 26 of these Specifications. This includes conduits and mounting of all electrical devices.

E. Furnishing of complete wiring diagrams showing proper control and interlock wiring shall be work under the trade supplying the equipment. Diagrams shall be based on the approved equipment for this project and shall be complete integral drawings, not a series of manufacturers' individual diagrams.

F. The electrical design and drawings are based on the equipment scheduled and shown on the mechanical Drawings and should any mechanical equipment requiring changes to the electrical design be approved, the required electrical changes shall be made at no cost to the Owner.

2.5 CONTROL POWER AND EQUIPMENT POWER FOR CONTROLS

A. Control power, whether it be DDC, 24 volt, or 120 volt, should be delivered to each piece of mechanical equipment and/or control panels whether or not it is specifically indicated on the Contract Drawings.

B. It is the Contractor's responsibility to include in his or her bid all costs in connection with control wiring, and/or power, whether or not it is specifically indicated. Regardless of how large in nature or how incidental, no additional compensation will be approved by the Owner's representative or Design Professionals concerning a failure on the Contractor's part to include these costs in bid proposal or a failure on the Contractor's part to properly coordinate these important functions.

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PART 3 - EXECUTION

3.1 PRODUCT HANDLING, RECEIVING, INSPECTION, AND STORAGE

A. Handling and Receiving: The Contractor shall receive and handle all materials and equipment with care so as not to cause damage. Use padded or strap slings, etc. as appropriate for the items being handled. Lift materials and equipment by lift points provided or recommended by the manufacturer.

B. Inspection: The Contractor shall upon receipt, inspect all materials and equipment for defects, damage, and compliance with the Specifications. When materials and equipment are received in acceptable condition, assume full responsibility for its storage, handling, and installation. Materials and equipment found to be incomplete or damaged shall be reported to the Carrier and Owner's representative immediately, within a maximum of three (3) days, for its replacement.

C. Identification: Upon receipt of all materials and equipment, the Contractor shall identify and tag, stencil, or otherwise permanently identify all materials and equipment with the appropriate equipment number.

D. Storage: Materials and equipment, which cannot be installed immediately after delivery, shall be stored in a safe, dry location provided by the Contractor. Materials and equipment damaged or stolen while in storage shall be replaced by the Contractor at no cost to the Owner.

3.2 COORDINATION WITH OTHER DIVISIONS AND OWNER

A. General: Cooperate to fullest extent with other Divisions and Owner to the end that all work shall be executed economically without delay and that it will not interfere with their operations.

B. Progress Schedule: Contractor shall inform himself of progress schedules of all Divisions and shall work in accordance with schedules for completion of work.

C. Examine work of other trades that comes in contact with or is covered by this work. Do not attach to, cover, or finish against any defective work, or install work of this Division in a manner that will prevent other trades from properly installing their work. Consult all Drawings, Specifications, and details of other Divisions of the work.

D. Do not install equipment with electrical characteristics that are not compatible with the electrical installation.

3.3 EQUIPMENT ACCESSORY REQUIREMENT

A. It shall be the Contractor's responsibility to assure all packaged equipment ancillary devices shall be completely wired, piped, tubed for pneumatics, and calibrated.

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3.4 INSTALLATION

A. Space And Equipment Arrangement:
   1. All equipment shall be installed in a manner to permit access to parts requiring service and to comply with code-mandated and manufacturer required clearances. Contractor shall notify Owner’s representative prior to installation of any equipment where said clearances cannot be maintained for further direction.
   2. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to permit access through stairways, doorways, or shafts shall be brought to the job and placed in the space before the enclosing structure is completed. Following placement in the space, such apparatus shall be thoroughly and completely protected from damage as hereinbefore specified.

B. Materials and equipment installed under this Contract shall be new in every respect, and installed in a first-class manner in accordance with the manufacturer's recommendations and applicable codes and standards.

C. The Contractor shall plan and coordinate his Work to provide all equipment and materials necessary to provide the Owner with a neat, functional, and serviceable installation.

D. The Contractor shall protect all work, materials, and equipment against damage until Final Acceptance by the Owner’s representative. Replace, or repair to the satisfaction of the Owner's representative, any work, materials, or equipment that becomes damaged prior to Final Acceptance.

E. The Contractor shall make a detailed inspection of the work area and adjoining construction prior to beginning installation of any materials or equipment. Verify governing dimensions and other permissible dimensional tolerances. The Contractor shall report in writing to the Owner's representative unsatisfactory conditions encountered; do not begin installation until conditions are correct. Beginning installation signifies acceptance of conditions.

3.5 CUTTING AND PATCHING

A. This Contractor shall do all necessary cutting and drilling of present walls, floor, ceilings, etc. for the installation of new work or for modifications to the existing work, but no structural work shall be cut unless specifically approved by the Owner's representative. Patching and painting of surfaces as required shall be by the Contractor, unless specified hereinafter.

B. Cutting and patching or repairing of work in place, made necessary by the negligence of the Contractor or anyone employed by him, shall be paid for by the Contractor.

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3.6 EXISTING FACILITIES

A. The Contractor shall be responsible for loss or damage to the existing facilities as used by him and his workmen, and shall be responsible for repairing or replacing such loss or damage. The Contractor shall send proper notices and receive written permission from the Owner's representative to enter existing areas. The Contractor before beginning work in existing areas shall make necessary arrangements and perform other services required for the care, protection, and in service maintenance of all electrical, communication, plumbing, heating, air conditioning, and ventilating services for new and existing facilities. The Contractor shall erect temporary barricades with necessary safety devices, as required to protect personnel from injury, removing all such temporary protection upon completion of the work.

B. The Contractor shall provide temporary or new services to all existing facilities as required to maintain their proper operation when normal services are disrupted as a result to the work being accomplished under this project.

C. Where existing construction is removed to provide working and extension access to existing utilities, the Contractor shall be responsible for removing doors, piping, air conditioning ductwork, and equipment, etc. to provide this access and shall reinstall same upon completion of work in the areas affected.

D. Where partitions, walls, floors, or ceilings of existing construction are indicated to be removed, the Contractor shall remove and reinstall in locations approved by the Owner's representative all devices required for the operation of the various electrical systems installed in the existing construction. This is to include but is not limited to temperature control system devices, electrical switches, relays, fixtures, piping, conduit, etc.

3.7 OUTAGES

A. Outages of services as required by the project will be permitted, but only at a time approved by the Owner. The Contractor shall notify the Owner in writing two weeks in advance of the requested outage in order to schedule required outages. No outages shall be taken unless written approval has first been received from the Owner. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the contract amount.

3.8 CONNECTION OF EQUIPMENT FURNISHED BY OTHERS

A. The Mechanical Division shall provide all mechanical connections to equipment furnished by other Divisions or the Owner that require service connections and/or ductwork.
   1. The Mechanical Division shall furnish materials and labor required for the connection of equipment except were indicated on Drawings as furnished by others.

B. The respective supplier shall furnish proper roughing-in diagrams for the installation of these items. All items shall be roughed-in and connected in strict accordance therewith.

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3.9 INSPECTIONS

A. Contractor shall arrange for all inspections required by local building officials and state agencies. Correct deficiencies required to comply with codes and standards and to receive certificate of occupancy. Upon completion of this project, submit written evidence of compliance with the above to Owner's representative. Final acceptance will not be issued and the warranty date will not be established until such compliance is demonstrated.

B. Contractor shall arrange for reviews by Engineer before any systems are covered up or insulation is installed on piping, ductwork and the like.

3.10 SYSTEMS START-UP

A. Upon completion of the installation of the work, start-up all mechanical systems and test, balance and adjust systems until they are fully operational and functioning as intended by Engineer.

B. Do not start-up or operate HVAC systems until construction of building envelope is complete and system components will not be subjected to damage from dirt, dust, construction debris, and weather. Provide temporary caps on ductwork and piping to prevent entry of debris. Where adequate protection is not provided, all systems shall be cleaned or replaced to the satisfaction of the Owner.

3.11 COMMISSIONING OF HVAC SYSTEMS

A. Upon completion of the HVAC installation, Contractor shall test, balance, adjust, and operate all individual components of the HVAC system. Demonstrate that the installation is functioning in all modes of operation as a complete and integrated HVAC system and is performing in accordance with the Contract Documents. Owner's personnel shall be trained in the operation and maintenance of the system. All operating schedules, parameters, and set-points shall be entered into the Building Automation Control system.

3.12 OPERATION OF HVAC SYSTEMS

A. It is the intent of the HVAC system design to operate HVAC systems continuously, 24 hours a day, 365 days a year, in either occupied or unoccupied modes of operation as described in 23 09 00 Building Automation System or 23 09 93 Sequence of Operation to provide for control of space temperature and humidity.

3.13 FINAL CONSTRUCTION REVIEW

A. Schedule: Upon completion of the Contract, there shall be a final construction review of the completed installation. Prior to this walk through, all work under this Division shall have been completed, tested, balanced and adjusted in final operating condition and the test report shall have been submitted to and approved by the Owner's representative.

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B. Personnel: A qualified person representing the Contractor must be present at this final construction review to demonstrate the system and prove the performance of the equipment.

C. The building mechanical system shall have been in operation for a minimum of 15 days after Test and Balance work is complete prior to this review.

3.14 CERTIFICATIONS

A. Before receiving final payment, the Contractor shall certify that all equipment furnished and all work done is in compliance with all applicable codes mentioned in these Specifications and with manufacturer's requirements.

B. Certification is specifically required from the following:
   1. Pressure test of all renovated and new pressure piping systems.
   2. Equipment performance tests.

3.15 RENOVATION OR REMODEL PROJECTS

A. The Contract Drawings are diagrammatic in nature and are not intended to indicate each and every fitting, offset, or other appurtenance necessary to complete the system. It is the Contractor's responsibility to visit the site and become familiar with the existing conditions and include in bid proposal all items necessary, regardless of the incidentiality, in order to provide the Owner with a complete and operational system. Any discrepancies noted by the Contractor shall be brought to the attention of the engineer in writing prior to the bid date. After the bids are turned in, the Contractor is expected to complete the systems at no additional cost to the Owner.

END OF SECTION 23 05 00

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SECTION 23 05 05 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Construction Schedule, and other submittals.

B. Related Sections include the following:
   1. Divisions 2 through 26 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Engineer's responsive action.

B. Informational Submittals: Written information that does not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
      a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Submittals Schedule: Comply with requirements in Division 1 Section 01 32 00 "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
   1. Initial Review: Allow 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer

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will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Re-submittal Review: Allow 15 working days for review of each re-submittal.
4. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 21 working days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Engineer and to Engineer's consultants, allow 15 working days for review of each submittal. Submittal will be returned to Engineer before being returned to Contractor.
6. Contractor’s failure to process submittals in a timely manner does not relieve Contractor of contractual obligations for the completion of the work.

D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Include the following information on label for processing and recording action taken:
    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.
        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 23 31 13.01). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., 23 31 13.01.A).
    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

E. **Deviations: Identify deviations from the Contract Documents in letter form at the beginning of each submittal section**.

F. The shop drawings are not intended to cover detailed quantitative lists of mechanical specialties, valves, air distribution devices, fixtures, and similar items. It is the Contractor's responsibility to procure the proper quantities required to comply with the established requirements.

G. Coordinate exact electrical requirements of HVAC equipment and fixtures with electrical division prior to submittal of brochures.

H. **Any material or equipment installed without the Owner Representative's prior approval shall, if so directed by the Owner's Representative, be removed and replaced with approved material or equipment at the Contractor's expense**.

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I. Test Reports: The Contractor shall submit to the Owner's representative all test reports in accordance with details specifically called for in the various Sections of the Specifications in this Division.

J. **Means of Submittal**:
   1. **Interim submittals** shall be forwarded to Engineer in **electronic format** delivered by means of e-mail or digital download link.
   2. **Final submittals and Operation and Maintenance** Manuals shall be forwarded in both **paper and electronic format** for record purposes. Provide one paper copy for Owner's records. Electronic shall be through both digital download link and physical copy on USB flash drive.

K. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return submittals, without review, received from sources other than Contractor.
   1. Transmittal Form: Provide locations on form for the following information:
      a. Project name.
      b. Date.
      c. Destination (To:).
      d. Source (From:).
      e. Names of subcontractor, manufacturer, and supplier.
      f. Category and type of submittal.
      g. Submittal purpose and description.
      h. Specification Section number and title.
      i. Drawing number and detail references, as appropriate.
      j. Transmittal number, numbered consecutively.
      k. Submittal and transmittal distribution record.
      l. Remarks.
      m. Signature of transmitter.
   2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.

L. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
   1. Note date and content of previous submittal.
   2. Note date and content of revision in label or title block and clearly indicate extent of revision.
   3. Resubmit submittals until they are marked “No Exception Taken” or “Make Corrections Noted”.

M. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

N. Use for Construction: Use only final submittals with mark indicating “No Exception Taken” or “Make Corrections Noted” taken by Engineer.

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PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.
   1. Items to be submitted shall include but shall not be limited to ductwork, pipe, valves, fittings, materials, hangers, special supports, insulation, fixtures, equipment, controls, coordination and ductwork fabrication drawings, central plant coordination and piping fabrication drawings, refrigerant piping design drawings, and mechanical room layouts.

B. Product Data: Submit information for each element of construction and type of product or equipment.
   1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
   2. Mark each copy of each submittal to show which products and options are applicable.
   3. Include the following information, as applicable:
      a. Manufacturer's written recommendations.
      b. Manufacturer's product specifications.
      c. Manufacturer's installation instructions.
      d. Manufacturer’s operation and maintenance clearances.
      e. Equipment performance characteristics.
      f. Equipment weights, dimensions, materials and construction details.
      g. Motor nominal size and brake horsepower.
      h. Electrical characteristics.
      i. All accessories and special conditions required by schedules, drawings, and specifications.
      j. Standard color charts.
      k. Manufacturer's catalog cuts.
      l. Wiring diagrams showing factory-installed wiring.
      m. Mill reports.
      n. Standard product operation and maintenance manuals.
      o. Compliance with specified reference standards.
      p. Testing by recognized testing agency.
      q. Application of testing agency labels and seals.
      r. Notation of coordination requirements.
   4. Information shall be presented so that line-by-line comparison may be made with Contract Documents. Deviation from Contract Documents shall be enumerated on separate sheet and so entitled. Data of general nature will not be acceptable.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
   1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Dimensions.
      b. Identification of products.

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c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Design calculations.
j. Compliance with specified standards.
k. Notation of coordination requirements.
l. Notation of dimensions established by field measurement.
m. Relationship to adjoining construction clearly indicated.
n. Seal and signature of professional engineer if specified.
o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
3. Number of Copies: Submit one interim opaque copy of each submittal, unless copies are required for operation and maintenance manuals. Submit minimum of three final copies where copies are required for operation and maintenance manuals. Engineer will return all copies to Contractor for inclusion in Project Record Documents (O&M Manuals).

D. Contractor's Coordination Drawings: The Contractor shall prepare a complete set of coordination drawings indicating the equipment actually purchased and the exact routing for piping, conduit, and ductwork. The elevations, locations, support points, load imposed on the structure at support and anchor points, and size of all lines shall be indicated. All beam penetrations and slab penetrations shall be indicated and sized and shall be coordinated. This requirement for coordination drawings shall not be construed as authorization for the Contractor to make any unauthorized changes to the Contract Drawings. All Design Drawing space allocations shall be maintained, such as ceiling height, chase walls, equipment room size, and the like, unless proper written authorization is received from the Engineer to change them.
1. Contractor is responsible for the timely preparation and submission of ¼"=1'-0" ductwork shop drawings indicating all items necessary for complete coordination and fabrication/installation. Contractor is also responsible for the timely preparation and submission of ½"=1'-0" shop drawings indicating all HVAC equipment, piping, and ductwork in Central Plants, Mechanical Rooms, mechanical areas and or critical areas that mandate a thorough review of the systems. Engineer will review these drawings for compliance and offer comments and or suggestions.
2. Submit refrigerant piping coordination drawings for direct expansion split systems.
3. Coordination drawings prepared by Contractor to illustrate how equipment, piping, ducts, and the like are to be fitted into available spaces will be examined under the assumption that the **Contractor has verified all the conditions**, and obtaining any approval thereon shall not relieve the Contractor of responsibility in the event the material cannot be installed as shown on those Drawings.
4. Any dimensional changes or rerouting of piping or ductwork shall necessitate submittal or shop drawings of the system under consideration prior to

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fabrication or erection of material. Drawings will be utilized by the Owner's representative to evaluate the effect of the proposed changes on equipment performance.

E. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, and telephone number of entities performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Engineer will return two copies.
   a. Mark up and retain one returned copy as a Project Record Document.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required herein or by other Specification Sections.
1. Number of Copies: Submit one electronic copy of each submittal, unless otherwise indicated.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

B. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

C. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

D. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

E. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

F. **Operation and Maintenance Manuals**: Upon completion of work, provide One (1) sets of complete operations and maintenance instructions of mechanical equipment, neatly bound in 3 ring binders. Each set shall also include a complete electronic version in PDF format on USB flash drive. Provide each binder with the name of Owner, Architect/Engineer, Contractor, and Title. During the construction period, accumulate the following for inclusion in the Operating and Maintenance Manuals:
1. Tabulation of equipment by manufacturer, model number, and serial number.
2. All warranties and guarantees and manufacturer's directions on equipment and material covered by the Contractor.
3. Approved fixture brochures, wiring diagrams, and control diagrams.

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4. Copies of shop drawings and submittals.
5. Operating instructions for all mechanical equipment and systems. Operating instructions shall include maintenance and seasonal changeover procedures.
6. Recommended maintenance procedures.
7. Repair parts list of all major items and equipment including name, address, and telephone number of local supplier or agent.
8. Valve tag charts and diagrams specified elsewhere herein.
9. Manufacturer’s letter certifying that the equipment has been installed per manufacturer’s installation manuals.
10. Contractor’s one (1) year warranty letter including start and finish dates.
11. Provide final copy of the Test, Adjust and Balance Report
12. Provide a final copy of the final Commissioning Report.
13. Provide final passing construction permit inspections certificates.

G. Operation and Maintenance instructions shall be submitted and approved prior to instruction of Owner's personnel in the various systems operation and maintenance.

H. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

I. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

J. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Engineer.
1. Engineer will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of

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reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S ACTION

A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will return each submittal with comments and indication of action required.

C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

F. Each submittal will be reviewed by Engineer for compliance with general requirements of design and arrangement only; Engineer’s comments or omission of comments do not relieve the Contractor of responsibility for performance of the work in compliance with all provisions and requirements of the Contract Documents. Job measurements and the coordination of all the dimensions for proper fit of all parts of the work and performance of all equipment supplies to meet Specification requirements are and remain specific responsibilities of the Contractor.

G. Engineer’s review of submittals does not relieve Contractor of his responsibility for deviations from Contract Documents or Contractor’s errors and omissions except when acceptance of the specific deviation is given in writing.

H. Engineer’s review is only for conformance with the design concept of the project and for compliance with the information given in the contract.
   1. The review shall not extend to means, methods, sequences, techniques, or procedures of construction or to safety precautions or programs incident thereto.
   2. The review shall not extend to review of quantities, dimensions, weight or gauges, fabrication processes or coordination with the work of other trades.

END OF SECTION 23 05 05

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SECTION 23 05 10 - STARTING OF HVAC SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Starting of HVAC Systems.

B. Commissioning of HVAC Systems.

C. Demonstration and Instructions.

D. Testing, Adjusting, and Balancing.

1.2 RELATED SECTIONS

A. Section 20 00 10 – Commissioning Plan.

B. Section 23 09 00 – HVAC Automatic Control System.

C. Section 23 09 93 – Equipment Sequence of Operation.

D. Section 23 05 93 – Testing, Adjusting, and Balancing.

E. All Divisions of Contract Documents.

PART 2 - PRODUCTS

2.1 Not Applicable.

PART 3 - EXECUTION

3.1 STARTING OF HVAC SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Owner’s representative seven (7) days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions that may cause damage.

D. Do not start-up or operate HVAC systems until construction of building envelope is complete and system components will not be subjected to damage from dirt, dust, construction debris, and weather.

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E. Provide temporary caps on ductwork and piping to prevent entry of debris. Where adequate protection is not provided, all systems shall be cleaned or replaced to the satisfaction of the Owner.

F. Clear dirt, dust, and grout from equipment on exterior of casings, interior surfaces, heat exchangers, heating and cooling coils, burners, and the like, and interior surfaces of ductwork prior to acceptance by Owner.

G. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

H. Adjust electrical amp draw on motors to within 80% of rated amp draw.

I. Verify wiring and support components for equipment are complete and tested.

J. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.

K. Activate and operate all HVAC equipment and systems and verify that the system is functioning properly in all modes and sequences of operation. When verification is complete, demonstrate all modes and sequences to Owner’s representative.

L. When specified in individual specification sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

M. Adjust return air to 500 fpm at each air unit inlet.

N. Replace drive packages as necessary to achieve design air flows.

O. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.2 DEMONSTRATION AND INSTRUCTIONS OF HVAC SYSTEMS

A. Demonstrate operation and maintenance of plumbing and HVAC equipment and systems to Owner's personnel two (2) weeks prior to date of final inspection.

B. Demonstrate project equipment and provide instruction by a qualified manufacturers' representative who is knowledgeable about the Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six (6) months.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

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E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.

F. Prepare and insert additional data in operation and maintenance manuals when need for additional data becomes apparent during instruction.

G. Record training sessions on video tape and provide copy to Owner.

3.3 HVAC - DEHUMIDIFICATION OF BUILDING

A. Start-up of HVAC cooling systems shall be accomplished in such a manner as to cool and dehumidify the space without the formation of condensation on building surfaces and elements, furniture, equipment, or appurtenances. Precautions should be taken by the contractor not to allow excessive humidity to develop in the building prior to final connection and activation of the HVAC system. Should it become necessary, the contractor shall procure the required equipment to properly dry and dehumidify the space so as not to force the HVAC to perform beyond its intended ability. Should damage occur due to start-up procedures, contractor shall be responsible for all costs associated with repair or replacement of damaged elements.

3.4 HVAC TESTING, ADJUSTING, AND BALANCING

A. **The Owner shall secure the services of an independent firm to perform testing, adjusting, and balancing, when specified in Section 23 05 93 – Testing, Adjusting, and Balancing.**

B. The independent firm will perform services specified in Section 23 05 93 – Testing, Adjusting, and Balancing.

C. Reports will be submitted by the testing agency to the Owner’s representative indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.

3.5 COMMISSIONING OF HVAC SYSTEMS

A. Upon completion of the HVAC installation, contractor shall test, balance, adjust, and operate all individual components of the HVAC system. Demonstrate that the installation is functioning in all modes of operation as a complete and integrated HVAC system and is performing in accordance with the Contract Documents. Owner’s personnel shall be trained in the operation and maintenance of the system. All operating schedules, parameters, and set-points shall be entered into the Facility Management System.

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B. Commissioning of the HVAC systems will be performed by Stridde, Callins and Associates, Inc. under direct contract with the Owner. This division shall assist the commissioning provider in the performance of their duties. Refer to Division 20 00 10 for the scope of work required of Division 23.

END OF SECTION 23 05 10

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SECTION 23 05 29 - HANGERS, SUPPORTS, AND FOUNDATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes pipe and equipment supports, hangers, flashings, curbs, equipment bases, foundations, sleeves, and sealing of work to adjacent construction.

1.2 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.

C. Product Data: Submit manufacturers catalog data including load capacity.

D. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Manufacturer's Installation Instructions: Submit special procedures and assembly of components.

1.3 QUALITY ASSURANCE

A. Perform work in accordance with code for piping support and in conformance with NFPA 13 and 14 for support of sprinkler piping and standpipes.

B. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Manufacturers:
1. Elcen.
2. Midland-Ross.
3. Michigan Hanger Co.
4. Sioux Chief.
5. ITT Grinnell.
6. B-Line.
7. Substitutions: Section 23 05 00 – Mechanical General Conditions.

B. Refrigerant Piping:
1. Conform to ASME B31.5 ASTM F708.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (13 to 38 mm): Malleable iron or carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 inches (50 mm) and Over: Carbon steel, adjustable, clevis.

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4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 inches: Pipe clamps and channel bracing secured to wall framing.
6. Vertical Support: Steel riser clamp.
7. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
8. Copper Pipe Support: Copper-plated carbon-steel ring.
9. Copper Piping Concealed in Stud Walls: Copper plated stud brackets.

C. Condensate Drain Piping:
1. Conform to ASME B31.9 ASTM F708.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (13 to 38 mm): Malleable iron or carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 inches (50 mm) and Over: Carbon steel, adjustable, clevis.
4. Wall Support for Pipe Sizes to 3 inches: Pipe clamps and channel bracing secured to wall framing.
5. Copper Pipe Support: Copper-plated, carbon-steel adjustable, ring.
6. Piping Concealed in Stud Walls: Galvanized steel or copper plated stud brackets.

2.2 ACCESSORIES

A. Hanger Rods:
1. Indoors Conditioned Spaces: Hot dipped galvanized or zinc plated mild steel threaded both ends, threaded on one end, or continuous threaded.
2. Outdoors Exposed to the Sun-UV: 316 Stainless Steel threaded on one end, or continuous threaded.
3. Outdoors and Un-conditioned Spaces Fully Shaded with no UV exposure: 316 Stainless Steel or FRP threaded both ends, threaded on one end, or continuous threaded.

2.3 PROTECTION OF HANGERS

A. Steel hangers, hanger rod and appurtenances located in crawl spaces, ventilated mechanical rooms, unconditioned attics or exposed to outdoors shall be hot dipped galvanized.
1. As an alternate method, components such as rollers, chairs, pipe stands, steel supports, etc., may be primed with PPG or equal Inhibitor Red Primer 6-208, and painted with two (2) coats of PPG or equal Enamel 54 Line.
2. All surfaces to be painted shall be free of dust, rust, scale, grease, or other foreign material, and shall be dry at time of painting.

B. All hangers, hanger rods, nuts, bolts, washers and appurtenances located in crawl spaces, ventilated mechanical rooms, unconditioned attics or exposed to outdoors shall have 100% 316 stainless steel construction for all system components.

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2.4 INSERTS

A. Manufacturers:
   1. ITT Grinnell.
   2. Midland-Ross.
   3. Elcen.
   4. B-Line.
   5. Substitutions: Section 23 05 00 – Mechanical General Conditions.

B. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.5 FLASHING

A. Metal Flashing: 26 gage thick galvanized steel.

B. Metal Counterflashing: 22 gage thick galvanized steel.

C. Flexible Flashing: 47 mil thick sheet butyl; compatible with roofing.

D. Caps: Steel, 22-gage minimum; 16 gage (1.5 mm) at fire resistant elements.

2.6 SLEEVES

A. Manufacturers:
   1. Holdrite.
   2. Pro Set.
   3. Substitutions: Section 23 05 00 – Mechanical General Conditions.

B. Sleeves for Pipes Through Non-Fire Rated Beams, Walls, Footings, and Potentially Wet Floors: minimum 20 gage thick stainless steel.

C. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed; Holdrite Hydroflame Pro Series Telescoping system.

D. Sleeves for Round Ductwork: Galvanized steel.

E. Sleeves for Rectangular Ductwork: Galvanized steel.

F. Stuffing or Fire-stopping Insulation: Glass fiber type, non-combustible.

G. Sealant: Acrylic in non-fire rated application.

2.7 FIRE STOP SYSTEMS

A. Manufacturers:
   1. 3m Model 2000.
   2. Spec Seal Model 100.
   3. Hilti.

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4. Substitutions: Section 23 05 00 – Mechanical General Conditions.

B. General Purpose Fire Stopping Sealant: Water based non-slumping, premixed sealant with intumescent properties, rated for 3 hours in accordance with ASTM E814 and UL 1479.

C. General Purpose Vibration Resistant Fire Stopping Sealant: Silicone based, non-slumping, premixed sealant with intumescent properties, vibration and moisture resistant, rated for 3 hours in accordance with ASTM E814 and UL 1479.

D. Plastic Pipe Systems Fire Stopping Sealant: Silicone based, premixed sealant with intumescent properties, vibration and moisture resistant, rated for 3 hours in accordance with ASTM E814 and UL 1479 with metal collars.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cast iron piping in accordance with CISPI Standards.

3.2 INSERTS

A. Install inserts for placement in concrete forms.

B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches (100 mm).

D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.3 PIPE HANGERS AND SUPPORTS

A. Piping systems shall be installed so as to be freely floating. They shall be securely supported from structure but shall be able to expand and contract independently of structure without causing undue stress or damage to the piping system. Piping shall not support itself. Piping systems shall be rigidly attached to structure only were shown on plans, as required by Specifications and codes, or as required for proper installation of equipment or fixtures. Provide sleeves, rollers, expansion fittings, expansion loops, or special fittings as required to prevent transmission or vibration to the structure or for the proper operation of systems whether specifically shown on plans or not.

B. Install in accordance with ASME B31.9, ASTM708.

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C. Support horizontal piping as scheduled.

D. Install hangers with minimum 1/2-inch (13 mm) space between finished covering and adjacent work.

E. Place hangers within 12 inches (300 mm) of each horizontal elbow.

F. Use hangers with 1-1/2 inch (38 mm) minimum vertical adjustment.

G. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

H. Support riser piping independently of connected horizontal piping.

I. Provide copper plated hangers and supports for copper piping.

J. Design hangers for pipe movement without disengagement of supported pipe.

K. Support base of risers in crawl spaces or above ceilings with braces, blocks, rodding or other suitable method, to prevent movement of pipe or separation of joints and fittings.

L. Paint pipe and equipment supports exposed to weather with galvanizing paint or other approved method.

M. Where piping is suspended in excess of 18 inches, provide sway bracing to secure against horizontal movement.

N. Install hangers adjacent to motor driven equipment with vibration isolation; refer to Section 23 05 48 – Vibration Isolation.

3.4 EQUIPMENT BASES, FOUNDATIONS, PIERS, SUPPORTS, AND ATTACHMENTS

A. Provide necessary foundations, supports, pads, equipment bases and piers, as required and shown on drawings or as required by manufacturer for equipment furnished by Mechanical Division. Materials, fixtures, and equipment shall be securely attached to the building structure. Attachments shall be strong, durable, and suitable for their intended application.

B. Provide housekeeping pads or foundations for every item of floor mounted equipment specified herein or indicated on the Drawings.

C. All concrete foundations required by equipment furnished by the Mechanical Division shall be constructed by the Mechanical Division (except where otherwise noted) in conformity with the recommendations of the manufacturer of the respective equipment and with the approval of the Owner's Representative.

D. Provide housekeeping pads of 4,000 PSI concrete, minimum 4 inches thick and extending 6 inches beyond supported equipment. Provide #3 steel reinforcing bar with

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12" on center square grid pattern. Steel members may be substituted for concrete pad where approved prior to installation, or as shown on drawings.

E. All corners of the foundations shall be neatly chamfered at a 45 degree angle.

F. After removal of the forms, the surface of the foundation shall be hand rubbed.

G. All concrete work performed by the Contractor shall conform entirely to the requirements of the General Specifications which describe this class of work.

H. Provide additional steel framing to raise equipment above housekeeping pad where necessary to properly construct p-traps and equipment drains.

I. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.

3.5 FLASHING

A. Provide flexible flashing and metal counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.

3.6 SLEEVES

A. Set sleeves in position in forms. Provide reinforcing around sleeves.

B. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

C. Extend sleeves through floors 2 inches above finished floor level. Caulk sleeves.

D. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent work with stuffing or fire stopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

E. Install chrome plated steel escutcheons at finished surfaces.

3.7 SCHEDULES

PIPE SIZE	MAX. HANGER SPACING	DIAMETER
Inches (mm)	Feet (m)	Inches (mm)
1/2 to 1-1/4 (12 to 32)	6.5 (2)	3/8 (9)
1-1/2 to 2 (38 to 50)	10 (3)	3/8 (9)
2-1/2 to 3 (62.to.75)	10 (3)	1/2 (13)
PVC (All Sizes)	6 (1.8)	3/8 (9)

END OF SECTION 23 05 29

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SECTION 23 05 48 - MECHANICAL VIBRATION ISOLATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes vibration isolation.

1.2 PERFORMANCE REQUIREMENTS

A. Provide vibration isolation on motor driven equipment 0.5 hp (0.35 kW) and over, plus connected piping and ductwork.

B. Consider upper floor locations critical unless otherwise indicated.

1.3 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Product Data: Submit schedule of vibration isolator type with location and load on each. Submit catalog information indicating, materials, dimensional data, pressure losses, and acoustical performance for standard sound attenuation products.

C. Manufacturer's Installation Instructions: Submit special procedures and setting dimensions.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of ductwork lagging. Record actual locations of hangers including attachment points.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with AMCA 300, ANSI S1.13, ARI 575, ASA 16 (ANSI S1.36) standards and recommendations of ASHRAE 68.

PART 2 - PRODUCTS

2.1 VIBRATION ISOLATORS

A. Manufacturers:
   1. The VMC Group.
   2. Mason Industries.
   3. Kinetics.
   4. Substitutions: Section 23 05 00 – Mechanical General Conditions.

B. Neoprene Pad Isolators:
   1. Durulene or neoprene-waffle pads.
      a. Hardness 30 Shore A Durometer.
      b. Minimum 7/8 – 1 inch thick.

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c. Maximum loading 40 psi.
d. Height of ribs: not to exceed 0.7 times width.
e. Size as required for application.

2. Configuration: 7/8 - 1 inch thick waffle pads bonded each side of ¼ inch thick steel plate.
   a. Indoors: Galvanized steel plate
   b. Outdoors: 316 stainless steel plate
3. Model:
   a. Kinetics Model NGD Combination Shear Pad and Plate
   b. VMC Model Shear-Flex Combination Shear Pad and Plate

C. Rubber Mount Hanger:
1. Provide hot dipped galvanized housing and rubber-in-shear isolator.
2. Molded rubber designed for 0.5 inches (13 mm) deflection rod connections.
3. VMC Type HR or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.

C. Connect wiring to isolated equipment with flexible hanging loop.

3.2 MANUFACTURER'S FIELD SERVICES

A. Inspect isolated equipment after installation and submit report. Include static deflections.

3.3 SCHEDULES

EQUIPMENT ISOLATION SCHEDULE

ISOLATED EQUIPMENT	
Air Cooled Condensing Units	Neoprene Pad
Suspended Exhaust Fans	Rubber Mount Hanger

END OF SECTION 23 05 48

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SECTION 23 05 53 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes nameplates, tags, stencils and pipe markers.

1.2 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.4 QUALITY ASSURANCE

A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255, UL 723.

B. Conform to NFPA 99 requirements for labeling and identification of medical gas piping systems and accessories.

C. Conform to ASME A13.1 for color scheme for identification of medical gas piping systems and accessories.

D. Maintain one copy of each document on site.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three (3) years documented experience.

PART 2 - PRODUCTS

2.1 NAMEPLATES

A. Manufacturers:
   1. Brady.
   2. Seton.
   3. LEM.
   4. Brimar
   5. Substitutions: Section 23 05 00 - Mechanical General Conditions.

B. Product Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

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2.2 TAGS

A. Metal Tags:
   1. Manufacturers:
      a. Brady.
      b. LEM.
      c. Seton.
      d. Brimar.
      e. Substitutions: Section 23 05 00 - Mechanical General Conditions.
   2. Brass with stamped letters; tag size minimum 1-1/2 inches diameter with finished edges.

B. Tag Chart: Typewritten letter size list of applied tags and location in anodized aluminum frame.

2.3 PIPE MARKERS

A. Color and Lettering: Conform to ASME A13.1.

B. Plastic Pipe Markers:
   1. Manufacturers:
      a. Brady.
      b. LEM.
      c. Seton.
      d. Brimar.
      e. Substitutions: Section 23 05 00 - Mechanical General Conditions.
   2. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.

2.4 CEILING TACKS

A. Manufacturers:
   1. Brady.
   2. LEM.
   3. Seton.
   4. Brimar.
   5. Substitutions: Section 23 05 00 - Mechanical General Conditions.

B. Description: Steel with 3/4-inch diameter color-coded head.

C. Color code as follows:
   1. HVAC equipment: Yellow.
   2. Fire dampers/smoke dampers: Red.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

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3.2 INSTALLATION

A. Install identifying devices after completion of coverings and painting.

B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

C. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer.

D. Install tags using corrosion resistant chain. Number tags consecutively by location.

E. Identify air handling units, condensing units, fans, packaged units and other mechanical equipment with plastic nameplates. Air devices do not require mechanical identification.

F. Identify control panels and major control components outside panels with plastic nameplates.

G. Tag automatic controls, instruments, and relays. Key to control schematic.

H. Identify indoor piping, concealed or exposed, with plastic pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

I. Provide ceiling tacks to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

J. Identify all equipment located above ceiling with nameplates affixed to lay-in ceiling grid frame adjacent to and right below each device.

K. Outdoor DX Condensing Units: Identify units with plastic nameplates. Nameplate shall indicate both the unit tag and the space is services. Examples: “ACCU-1, Class Rm 121/122”, “ACCU-1 Library”, “ACCU-1, Office 01/02/03/04”.

END OF SECTION 23 05 53

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SECTION 23 05 58 - ACCESS DOORS

PART 1 - GENERAL

1.1 WORK INCLUDES

A. Furnish and install access doors in inaccessible wall or ceiling locations as required or shown for access to valves, controls, regulating devices, water hammer arrestors, trap-primers, cleanouts, fire dampers, air distribution devices, and other equipment requiring maintenance, adjustment, or operation.

PART 2 - PRODUCTS

2.1 NON-FIRE RATED ACCESS DOORS

A. Furnish Inryco/Milcor, Acudor, Elmdor, or equal with 16 gauge frames, 14-gauge panels, and 22-gauge casing head. Provide continuous concealed hinges and flush screwdriver cam lock. Use Style K access doors for plastered surfaces, Style M for masonry or gypboard surfaces. Use Style AP for acoustical plaster ceiling, with 18-guage panel and all-galvanized construction.

2.2 FIRE RATED ACCESS DOORS

A. Furnish Inryco/Milcor, Acudor, Elmdor, Nystrum, or equal, UL listed, 1-1/2 hour Label “B”, access doors with 16-gauge steel frames, and 20-gauge insulated sandwich-type door panel. Provide door with continuous concealed hinge and automatic closing and latching mechanism.

2.3 FINISHED AREAS

A. Provide stainless steel access doors were located in finished areas that are accessible to the general public such as but not limited to toilet rooms, offices, corridors, and classrooms.

PART 3 - EXECUTION

3.1 EXECUTION

A. Access doors specified in Division 23 will be installed by other divisions. Not all required access doors are shown. Coordinate with the contractor to locate access doors for ease of operation and maintenance of concealed equipment.

B. Installation shall be in accordance with the manufacturer’s printed instructions.

C. Access doors shall be of sufficient size to perform all necessary service and maintenance tasks.

END OF SECTION 23 05 58

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SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Testing, adjusting, and balancing of air systems.

B. Testing, adjusting, and balancing of hydronic systems.

C. Measurement of final operating condition of HVAC systems.

1.2 SCOPE OF WORK

A. Owner shall secure the services of an independent Testing, Adjusting, and Balancing Agency to perform complete testing, adjusting and balancing of the Heating, Ventilating and Air Conditioning system. Mechanical Contractor shall coordinate work with testing agency and shall not include the cost of testing within their bid proposal.

B. Responsibility of Mechanical Contractor:
1. Mechanical Contractor shall be responsible for complete system start-up prior to testing, adjusting and balancing and shall demonstrate operation of each item of mechanical equipment.
2. Motor amp draw shall be checked and adjusted to within 80% of rated amp draw during start-up procedures on all motors. Replace drive packages as necessary to achieve design conditions.
3. Set return air velocity to 500 fpm at each air unit inlet during start-up procedures.
4. Attend pre-balancing conference with testing agency to demonstrate operation of system.
5. Install clean filters in all air units.
6. Verify that systems are complete and operable. Refer to Part 3, Paragraph 3.1A.
7. Cooperate with Testing and Balancing Agency to provide all necessary data on the design and proper application of the system components and furnish all labor and material required to eliminate any deficiencies or malperformance. Resolve all operational deficiencies prior to submission of final TAB report.
8. Install all valves, dampers, sheaves, and miscellaneous adjustment devices in a manner that will leave them accessible and readily adjustable. The TAB Agency may be consulted if there is a questionable arrangement of a control or adjustable device.
9. Cooperate with Commissioning Provider to provide all necessary assistance in demonstration and operation of all HVAC system components. Provide test reports as required by Commissioning Provider for functional performance testing.

C. Responsibility of Testing, Adjusting and Balancing Agency (TAB):
1. During construction, inspect the installation of ductwork, Facility Management System and all other components of the HVAC system. Inspection will cover that part of the work relating to proper arrangement and adequate provisions for the

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testing and balancing. The inspections shall be performed periodically as the work progresses with a minimum of two inspections as follows:
   a. When 60% of ductwork is installed in each building.
   b. When 90% of ductwork is installed in each building.
2. Submit brief written report of each inspection to Owner, Architect, Engineer, and Contractor.
3. Provide all instruments and equipment required to accomplish necessary testing, adjusting and balancing and as required by the Engineer to verify performance. All instruments shall be in accurate calibration and shall be calibrated in ranges that will be expected.
4. Field verify equipment nameplate electrical data. Do not derive data from submittal documents.
5. Upon completion of the installation and start-up of the mechanical equipment by the Mechanical Division, the Testing, Adjusting and Balancing Agency will test, adjust and balance the system components to obtain optimum conditions in each conditioned space in the facility. TAB Agency shall work with the Automatic Temperature Controls Contractor in commissioning the operation of all motorized/balancing duty control dampers. The TAB Agency is advised that deficiencies in HVAC construction are often encountered during final TAB services and Agency should include in bid proposal an amount it deems adequate to compensate for time in identifying the deficiencies to the Mechanical Contractor and awaiting their correction.
6. As soon as possible or a minimum of fourteen days, or earlier, prior to Owner's Final Inspection as requested by the General Contractor, the Testing and Balancing Agency shall prepare seven copies of the completed Testing and Balancing Report and submit one copy to Owner and six copies to the Architect/Engineer. The reports shall be certified accurate and complete by a principal Engineer of the Agency. Resolve all operational deficiencies prior to submission of final report.
7. Cooperate with Commissioning Provider to provide all necessary assistance in demonstration and operation of all HVAC system components. Provide test reports as required by Commissioning Provider for functional performance testing.
8. Commissioning:
   a. Refer to Specification Section 20 00 10 for commissioning plan and commissioning requirements.
   b. Cooperate with Commissioning Provider to provide all necessary assistance in demonstration and operation of all HVAC system components. Provide test reports as required by Commissioning Provider for functional performance testing.

1.3 REFERENCES

A. AABC - National Standards for Total System Balance.

B. ADC - Test Code for Grilles, Registers, and Diffusers.

C. ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-conditioning, and Refrigeration Systems.

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D. NEBB – Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

E. SMACNA - HVAC Systems Testing, Adjusting, and Balancing.

1.4 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Submit name of adjusting and balancing agency for approval within 30 days after award of Contract.

C. Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

D. Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.

E. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect/Engineer and for inclusion in operating and maintenance manuals.

F. Provide reports in 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

G. Include detailed procedures, agenda, sample report forms prior to commencing system balance.

H. Test Reports: Indicate data on AABC National Standards for Total System Balance forms, forms prepared following ASHRAE 111 or NEBB forms.

1.5 PROJECT RECORD DOCUMENTS

A. Section 23 05 05 – Submittal Procedures.

B. Record actual locations of flow measuring stations, balancing valves and rough setting.

1.6 QUALITY ASSURANCE

A. Perform total system balance in accordance with AABC National Standards for Field Measurement and Instrumentation, Total System Balance or ASHRAE 111 or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

1.7 QUALIFICATIONS

A. Agency: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years documented experience certified by AABC or NEBB.

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B. Perform Work under supervision of AABC Certified Test and Balance Engineer or NEBB Certified Testing, Balancing and Adjusting Supervisor.

1.8 PRE-BALANCING CONFERENCE

A. Convene one (1) week prior to commencing work of this section.

1.9 SEQUENCING

A. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project.

1.10 DESIGN CONDITIONS

A. The HVAC systems have been designed to maintain the inside conditions indicated below when operating with the outside conditions stated. HVAC systems are intended to operate 24 hours a day, year-round, in either occupied or unoccupied mode as described in Specification 23 09 00 and 23 09 23. Install, test, adjust and balance the systems so that they will produce the inside conditions for design. Mechanical Contractor shall be prepared to provide a suitable test to prove that equipment is producing capacities scheduled.

B. Inside Conditions:
   1. Summer: 75 degrees Fahrenheit dry bulb
      55% relative humidity
   2. Winter: 70 degrees Fahrenheit dry bulb

C. Outside Conditions:
   1. Summer: 100 degrees Fahrenheit dry bulb
      81 degrees Fahrenheit wet bulb
   2. Winter: 30 degrees Fahrenheit dry bulb

PART 2 - PRODUCTS

2.1 Not Applicable.

PART 3 - EXECUTION

3.1 AGENCIES

A. Precision Air of Texas, Inc.

B. Technical Air Balance, Inc.

C. Engineered Air Balance Co., Inc.

D. PHI Service Agency, Inc.

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E. Testing Specialties, Inc.

F. Testing & Commissioning Services, LLC.

G. Reynolds Engineering, LLC.

H. Professional Engineer Balance Lab, Inc.

I. Cleary Zimmerman Engineers, Inc.

J. Other Acceptable Agencies: Section 23 05 00 – Mechanical General Conditions.

3.2 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
   1. Systems are started and operating in a safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   5. Duct systems are clean of debris.
   6. Fans are rotating correctly.
   7. Fire and volume dampers are in place and open.
   8. Air coil fins are cleaned and combed.
   9. Access doors are closed and duct end caps are in place.
   10. Air outlets are installed and connected.
   11. Duct system leakage is minimized.
   12. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies noted during performance of services that prevent system balance.

C. Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

B. Drive assemblies. In the event that the drive assembly requires a change in belts and pulleys, or requires an increase in motor horsepower, it shall be the responsibility of the HVAC Division to:
   1. Determine the size of the replacement equipment.
   2. Obtain and install the replacement equipment at no additional cost to Owner.

C. Manual volume dampers:
   1. In all cases, air volumes shall be adjusted by means of manual dampers in the ductwork, not by integral dampers in the terminal outlets or inlets.

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2. Duct damper positions shall be marked with permanent-ink markers or black spray paint after the final setting has been made.

3.4 DUCT AND EQUIPMENT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts or equipment that will not damage equipment or ductwork. Provide caps with neoprene plugs, threaded plugs, or threaded or twist-on metal caps. All caps must be sealed vapor tight with appropriate silicone or duct sealant.

B. Permanent Test Holes: Factory fabricated, airtight flanged fittings with screw cap. Furnish extended neck fittings to clear insulation where applicable.

C. Double Walled Equipment: Provide caps on both sides of wall.

D. Insulation: TAB Contractor is responsible for repairing any damaged insulation on equipment, ductwork, piping, piping specialties, and the like at completion of TAB work. TAB Contractor shall make repairs in accordance with insulation manufacturer's requirements or subcontract repairs to a company who specializes in insulating.

E. **Do not drill holes in outdoor equipment or outdoor ductwork. If test holes are required, consult with Engineer prior to performance of work.**

3.5 INSTALLATION TOLERANCES

A. Contractor shall adjust all equipment in accordance with the capacities shown on the drawings, with permissible tolerances as follows:

Supply fans	-5% to +5%
Return	+5% to -5%
Exhaust fans	0% to -5%
Diffusers/supply grilles	-5% to +5%
Return grilles	0% to -5%
Exhaust grilles	0% to -5%

3.6 ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

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E. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

F. Check and adjust systems approximately six months after final acceptance and submit report.

3.7 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system, including supply register and diffuser blade patterns, to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

3.8 SCHEDULES

A. Equipment Requiring Testing, Adjusting, and Balancing:
   1. Air Cooled Condensing Units.
   2. Air Handling Units.
   3. Fans.
   4. Air Filters.
   5. Air Inlets and Outlets.
   6. Packaged Terminal Units.

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3.9 EXAMPLE REPORT FORMS

A. Title Page:
1. Name of Testing, Adjusting, and Balancing Agency.
2. Address of Testing, Adjusting, and Balancing Agency.
3. Telephone number of Testing, Adjusting, and Balancing Agency.
4. Project name.
5. Project location.
6. Project Architect.
7. Project Engineer.
8. Project Contractor.
9. Report date.

B. Summary Comments:
1. Design versus final performance.
2. Notable characteristics of system.
3. Description of systems operation sequence.
4. Summary of outdoor air and exhaust flows to indicate amount of building pressurization.
5. Nomenclature used throughout report.
6. Test conditions.

C. Instrument List:
1. Instrument.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Range.
6. Calibration date.

D. Electric Motors:
1. Manufacturer.
2. Model/Frame.
3. HP/BHP.
4. Phase, voltage, amperage; nameplate, actual, no load.
5. RPM.
6. Service factor.
7. Starter size, rating, heater elements.
8. Sheave Make/Size/Bore.

9. efficiency.
10. Heat output.

E. Air Cooled Condensing Unit:
1. Identification/number.
2. Location.
3. Manufacturer.
4. Model number.
5. Serial number.

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6. Entering DB air temperature, design and actual.
7. Leaving DB air temperature, actual.
8. Number of compressors.
9. Refrigerant type.
10. Operating refrigerant head and suction pressures.

F. Direct Expansion Cooling Coil Data:
1. Identification/number.
2. Location.
3. Service.
4. Manufacturer.
5. Air flow rate, design and actual.
6. Entering air dry bulb DB and wet bulb WB temperatures, design and actual.
7. Leaving air dry bulb DB temperature, design and actual.
8. Saturated suction temperature, design and actual.
9. Air pressure drop, design and actual.

G. Electric Resistance Heater:
1. Manufacturer.
2. Identification/number.
3. Location.
4. Model number.
5. Design capacity kW.
6. Number of stages.
7. Phase, voltage, amperage.
8. Test voltage (each phase).
9. Test amperage (each phase).
10. Air flow, specified and actual.
11. Entering and leaving air dry bulb DB temperatures, specified and actual.

H. Return Air/Outside Air Data:
1. Identification/location.
2. Total air flow rate, design and actual.
3. Return air flow rate, design and actual.
4. Outside air flow rate, design and actual.
5. Return and outside air temperatures.
6. Mixed air temperature, actual and design.
7. Design and actual outside/return air ratio.

I. Exhaust Fan Data:
1. Location.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Air flow rate, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet and discharge pressures.
8. Sheave Make/Size/Bore.
9. Number of Belts/Make/Size.

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10. Fan RPM.
11. Motor voltage and current draw, name plate and actual.

J. Duct Traverse:
1. Location.
2. Test instrument used.
3. System zone/branch.
4. Duct size (I.D.) and area.
5. Actual air velocity readings in grid form to represent location in duct.
6. Actual average air velocity.
7. Design and actual air flow rate.
8. Duct static pressure.
9. Air dry bulb temperature.
10. Air correction factor.

K. Air Inlets and Outlets:
1. System designation.
2. Inlet or outlet number and area served.
3. Size and type.
4. Design and final air volumes.

L. Packaged Terminal Unit:
1. Identification/number.
2. Location.
3. Manufacturer.
4. Model number.
5. Serial number.
6. Condensing Section Data:
   a. Entering air dry bulb DB temperature, design and actual.
   b. Leaving air dry bulb temperature, actual.
   c. Number of compressors.
7. Direct Expansion Evaporator Coil Data:
   a. Air flow rate, design and actual.
   b. Entering air dry bulb DB and wet bulb WB temperatures, design and actual.
   c. Leaving air dry bulb DB temperature, design and actual.
   d. Saturated suction temperature, design and actual.
   e. Air pressure drop, design and actual.
8. Electric Resistance Heater:
   a. Design capacity kW.
   b. Number of stages.
   c. Phase, voltage, amperage.
   d. Test voltage (each phase).
   e. Test amperage (each phase).
   f. Air flow rate, specified and actual.
   g. Entering and leaving air dry bulb DB temperatures, specified and actual.
9. Evaporator Fan:
   a. Arrangement/Class/Discharge.
   b. Air flow rate, specified and actual.

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c. Return air flow rate, specified and actual.
d. Outside air flow rate, specified and actual.
e. Total static pressure (total external), specified and actual.
f. Inlet and discharge air pressure.
g. Fan RPM.

END OF SECTION 23 05 93

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SECTION 23 07 00 - MECHANICAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes ductwork insulation, insulation jackets, equipment insulation, covering, thermal insulation for piping systems including vapor retarders and accessories.

1.2 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Product Data: Submit product description, thermal characteristics, and list of materials and thickness for each service, and location.

1.3 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.

B. Applicator: Company specializing in performing work of this Section whose primary business is insulation with minimum three (3) years documented experience.

1.4 QUALITY ASSURANCE

A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255, UL 723.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

B. Maintain temperature during and after installation for minimum period of 24 hours.

1.7 REGULATORY COMPLIANCE

A. Comply with latest Department of Energy regulations and ASHRAE 90.1 Standards, applicable International Energy Conservation Code 2015.

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1.8 DEFINITIONS

A. Indoor/Outdoor Clarification: All duct and pipe insulation installed in un-conditioned spaces and outdoors shall be insulated the same way. The words un-conditioned and outdoors shall be considered the same type of space regardless of definitions elsewhere in other specification sections.

PART 2 - PRODUCTS

2.1 GLASS FIBER, FLEXIBLE

Insulation for exterior of sheet metal ducts, backside of diffusers, storm drainage piping, and bottom side of roof drain bodies.

A. Manufacturers:
   1. Johns Manville Model Microlite.
   2. Knauf Model Ductwrap.
   3. Owens Corning.

B. Insulation: ASTM C553 Glass Fiber Blanket Thermal Insulation for Commercial and Industrial Applications, Type II.
   1. K Value: ASTM 518, 0.29 at 75 degrees F.
   2. Maximum Service Temperature: ASTM C411, 250 degrees F.
   3. Maximum Moisture Absorption: ASTM C1104, 0.2 percent by volume.
   4. Moisture Vapor Transmission: ASTM E96, 0.02 perm.
   5. Density: 0.75 or 1.0 pounds per cubic foot.
   6. Minimum Installed R-Value: Refer to Part 3, Schedules.

C. Vapor Retarder Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film ASTM C1136, Type II.
   2. Moisture vapor transmission: ASTM E96; 0.02 perm.
   3. Secure with galvanized steel outward clinching staples and pressure sensitive tape.

D. Vapor Retarder Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
   2. All connections, longitudinal and circumferential seams and laps, shall be additionally sealed over tape with a brush applied coat of mastic. Foster Model FDS-181 “Air-Tight Duct Sealant” or equal.

E. Installation: Maximum allowable compression is 25 percent.

F. Indoor Vapor Barrier Finish:
   1. Childers CP-30:
      a. ASTM E-96, 0.02 perms at 0.02” dry film thickness.
      b. Indoor/Outdoor vinyl emulsion type acrylic, compatible with insulation, white color.
   2. Fosters 30-80:
      a. ASTM E-96, 0.03 perms at 73 mils dry film thickness.

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b. Indoor/Outdoor low odor, water based compatible with insulation, white color.

G. Outdoor Vapor Barrier Finish:
1. Manufacturers:
a. Childers CP-35.
b. Fosters 35.
2. Vinyl emulsion type acrylic, compatible with insulation, white color.

2.2 ELASTOMERIC CELLULAR FOAM FOR PIPING OR EQUIPMENT

A. Manufacturers:
1. Armstrong Model AP Armaflex.

B. Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular form, Closed Cell: ASTM C534; Type I, Tubular form. CFC, HCFC, HFC free.
1. K Value (Btu-in/(hr*ft^2*F°)), ASTM C177 or C518:
a. 1” Thickness:
1) Mean Temperature 75°F = 0.245.
2) Mean Temperature 90°F = 0.254.
b. 1-1/2”-2” Thickness:
1) Mean Temperature 75°F = 0.28.
2) Mean Temperature 90°F = 0.286.
2. Water Vapor Permeability, ASTM E96, Procedure A (Perm-in):
a. 1” Thickness: 0.05.
b. 1-1/2”-2”: 0.08.
3. Minimum Service Temperature, ASTM C534: -297 degrees F.
4. Maximum Service Temperature, ASTM C534:
a. 1” Thickness: 220 degrees F.
b. 1-1/2”-2” Thickness: 300 degrees F.
5. Maximum Moisture Absorption, ASTM C209: <0.2% by volume.
6. Surface Burning Characteristics, ASTM E84:
a. Flame Spread: ≥25.
b. Smoke Development: ≥50.
7. Minimum R-value or Thickness: Refer to Part 3, Schedules.

C. Elastomeric Foam Adhesive:
1. Manufacturers:
a. Armstrong Model 520.
2. Air-dried, contact adhesive, compatible with insulation.

D. Insulation Tape: Elastomeric foam tape of same material as insulation.

E. Insert Material: Compression resistant elastomeric foam material.

F. Finish Paint Coating (Indoor and Outdoor Applications):
1. Armaflex WB Finish or equal.
2. Water-based latex enamel paint with elastomeric and U.V. resistant properties, white finish color. Provide two coats minimum.

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2.3 JACKETS

A. Pipe Insulation Fittings: Contractor shall NOT use any PVC plastic fittings as the primary insulation cover vapor barrier. All insulation coverings shall be constructed of hard cast fiberglass cloth with mastic and finished vapor barrier. PVC fitting shall only be used for aesthetical purposes in exposed areas.

B. (Outdoor) Aluminum Jacket – Refrigerant Pipe and Fittings Outdoors: ASTM B209.
   1. Manufacturers: Johns Manville Insulation Systems, Model Aluminum Roll Jacketing (Cladding).
   2. Jacket:
      a. Aluminum Alloy: 3003 or 3105.
      b. Thickness: 0.016 inch sheet.
      c. Finish: Smooth (Paint Mill).
      d. Joining: Longitudinal slip joints and 2 inch laps.
      e. Fittings: 0.24 inch thick die shaped fitting covers with factory attached protective liner.
      f. Metal Jacket Bands: 1/2 inch wide; 0.020 inch thick aluminum or stainless steel.
      g. Color: Anodized aluminum.

2.4 GENERAL SEALANT

A. Manufacturers / Product:
   1. Foster Model FDS-181 “Air-Tight Duct Sealant”, white or gray.
   2. Rector Seal / Air-Lock 181.
   3. Design Polymerics / DP 1020.

B. Non-hardening, Non-flammable; water-based; fiber reinforced; mildew, water and U.V. resistant; compatible with mating materials; UL listed 181A or 181B; liquid used alone or with tape or heavy mastic.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify piping, equipment, and ductwork have been tested before applying insulation materials.

B. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with NAIMA National Insulation Standards and Manufacturers instructions.

B. It shall be the responsibility of the contractor to ensure that an effective insulation and vapor seal is achieved on all cold surfaces which will eliminate any sweating or condensation on any cold surfaces installed by the contractor.

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C. Building Penetration Sleeves:
   1. Contractor shall provide sleeves at all building penetrations “Wall, Floors and Roofs” with sufficient room for the installation of finished insulation products.
   2. All exterior penetrations shall be suitably weatherproofed air and water tight. All sealants shall be compatible with building system and shall be U.V. resistant.

D. Exposed Piping: Locate insulation and cover seams in least visible locations.

E. Insulated Pipes Conveying Fluids Below Ambient Temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, expansion joints, air separators, suction diffusers, expansion tanks and chemical feeders.
   1. Furnish factory-applied or field-applied vapor retarder jackets. Secure jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips, then with outward clinch expanding staples. Staples shall have stainless steel construction. Seal staple penetrations with vapor retarder mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe or as specified in Part 3 - 3.3 Schedules. Finish with glass cloth and vapor retarder adhesive.
   3. Insulate piping components such as nipples, valve stems or other cold surfaces were condensation forms with elastomeric cellular foam insulation.

F. Equipment Connections: Seal duct and piping at point of connection to equipment to maintain vapor barrier.

G. Shields at Support Locations:
   1. Shields, All Pipe Sizes:
      a. Material:
         1) Indoors: Galvanized Steel.
         2) Outdoors: 316 Stainless Steel.
      b. Length:
         1) 1-1/2”-6” = Minimum 8” Long.
         2) 8”-10” = Minimum 12” Long.
         3) 12” and Over = Minimum 18” Long.
      c. Minimum 18-gage.
      d. Provide between pipe hangers or pipe hanger rolls and inserts. Length shall be 4 inches shorter than insert to allow for vapor retarding butt joints.

H. Elastomeric Cellular Foam Insulation – Piping:
   1. Apply adhesive at butt ends of joints and fittings.
   2. Fittings shall be mitered or template-cut in accordance with manufacturer’s instructions. Do not slide tubing over 90-degree elbows.
   3. Inserts: Provide rigid elastomeric insulation at pipe hangers for pipe sizes 1 1/2 inch and larger to prevent compression of insulation.

I. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one (1) hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to architectural for penetrations of assemblies with fire resistance rating greater than one hour.

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J. Exterior Applications: Provide vapor retarder jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor retarder cement. Cover with aluminum jacket with seams located at 3 or 9 o'clock position on side of horizontal piping with overlap facing down to shed water or on bottom side of horizontal equipment.
   1. Elastomeric Insulation – Apply two coats of ultraviolet resistant paint.

K. Factory Insulated Equipment: Do not insulate, except when indicated on Drawings, or other sections of Specifications.

L. Exposed Equipment: Locate insulation and cover seams in least visible locations.

M. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

N. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.

O. Insulated Equipment Containing Fluids Below Ambient Temperature: Insulate entire system.

P. Finish insulation at supports, protrusions, and interruptions.

Q. Nameplates and ASME Stamps: Bevel and seal insulation around; do not insulate over.

R. Test and Service Ports: Insulation shall not cover any test or system service ports. Contractor shall install extensions on ports as needed to extend port for easy access outside of the finished insulation thickness.

S. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

T. Insulated Ductwork Conveying Air Below Ambient Temperature:
   1. Provide insulation with vapor retarder jackets.
   2. Finish with tape and vapor retarder jacket.
   3. Seal over tape with sealant at all connections. All connections, longitudinal and circumferential seams and laps, shall be additionally sealed over tape with a brush applied coat of vapor retarding mastic.
   4. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
   5. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, expansion joints, diffuser plenums, and return plenums.
   6. Seal insulation airtight where duct hanger straps penetrate insulation vapor barrier.

U. Duct and Plenum Liner Application:
   1. Adhere insulation with adhesive for 100 percent coverage.
   2. Secure insulation with mechanical liner fasteners. SMACNA Standards for spacing.

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3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

V. Install according to manufacturer's recommended stretch out chart and to manufacturer's installation instructions where more stringent than herein.

3.3 SCHEDULES

Provide minimum thickness or R-value as follows. Increase as necessary for compliance with local code. R-values are installed values.

A. Cooling Systems:
1. Condensate Drain Pipes (50 degrees F. and above)
a. Indoors and Within Building Envelopes:
1) Elastomeric Cellular Foam Insulation:
a) Pipe Size Range: All sizes.
(1) Thickness: 3/4 inch.

2. Refrigerant Suction:
a. Elastomeric Cellular Foam Insulation:
1) Pipe Size Range: 1/2 to 1 1/2 inch.
a) Thickness: 1 inch.

B. CF-1, Exhaust Ducts: Flexible Glass Fiber Ductwork Insulation, Exterior, Minimum Installed R=6.0 for complete system.

C. AHU-E-1, Supply and Return Ducts: Flexible Glass Fiber Ductwork Insulation, Exterior, Minimum Installed R=8.0.

D. Fire Dampers: Provide external fiberglass insulation board or wrap as needed to maintain a continuous thermal barrier through wall assemblies. Refer to drawings for further details and coordinate with the HVAC contractor.

END OF SECTION 23 07 00

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SECTION 23 09 00 - HVAC AUTOMATIC CONTROL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes HVAC Automatic Control System (ACS) utilizing custom fabricated electro mechanical controls for the High School Stadium Improvements, Calallen ISD, Corpus Christi, Texas.

B. ACS system shall be provided by or subcontracted directly by the Mechanical Contractor.

1.2 SCOPE OF WORK

A. PTAC Units: Provide control from remote mounted standalone thermostats provided by the equipment manufacturer. Refer to Specifications Section 23 81 13.

B. AHU/ACCU-E-1: Provide control from remote mounted standalone thermostat provided by the HVAC Contractor.

C. Restroom 2-Speed Exhaust Fans, Occupancy/Temperature: Project scope is to provide automatic temperature control system with stand-alone integrated type devices as indicated by Control Schematic 4, Sheet M6.2 as required to accomplish the equipment sequence of operations.

D. Janitor/Custodial Exhaust Fans: Provide with high voltage thermostats for low temperature limit control.

E. Single Fixture Restrooms, Toilet or Family Exhaust Fans: Provide high voltage fan operation from lighting system based on occupancy.

1.3 ACS CONTRACTORS

A. The Controls Contractor shall be a factory authorized and certified system and service provider with proven experience. The successful Controls Contractor shall provide references from a minimum of Five (5) commercial grade facilities with similar type work scope.

1.4 ACS DESCRIPTION

A. ACS system shall be fabricated with all of the specified controllers, thermostats, and the like devices.

B. The ACS work shall consist of the provision of all labor, materials, tools, equipment, interfaces, wiring, tubing, installation, labeling, engineering, calibration, documentation, samples, submittals, testing, commissioning, training services, permits and licenses, transportation, shipping, handling, administration, supervision, management, insurance, temporary protection, cleaning, cutting and patching, warranties, services, and items, even though these may not be specifically mentioned in these Division

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documents which are required for the complete, fully functional and commissioned ACS.

C. Provide a complete, neat and workmanlike installation. Use only manufacturer certified employees who are skilled, experienced, trained, and familiar with the specific equipment, software, standards and configurations to be provided for this Project.

D. Manage and coordinate the ACS work in a timely manner in consideration of the Project schedules. Coordinate with the associated work of other trades so as to not impede or delay the work of associated trades.

1.5 QUALITY ASSURANCE

A. The ACS Contractor shall be the authorized installing contractor for HVAC control systems.

B. Responsibility: The ACS Contractor shall be responsible for inspection and Quality Assurance for all materials and workmanship furnished.

C. Component Testing: Maximum reliability shall be achieved through extensive use of high-quality, pre-tested components. Each and every controller, sensor, and all other control components shall be individually tested by the manufacturer prior to shipment.

D. The ACS Contractor shall provide all tools, testing, and calibration equipment necessary to ensure reliability and accuracy of the system.

E. ACS shall be engineered, programmed and supported completely by representative's local office that must be within 100 miles of project site.

F. The ACS architecture shall consist of the products of a manufacturer regularly engaged in the production of HVAC control systems and shall be the manufacturer's latest standard of design at the time of proposal.

1.6 RELATED SECTIONS

A. The General Conditions of the Contract and Supplementary General Conditions are part of this specification and shall be used in conjunction with this section as part of the contract documents.

B. The following sections constitute related work:
1. Section 26 00 00 – Electrical Specifications.
2. Section 23 05 00 – Mechanical General Conditions.
3. Section 23 09 93 – Equipment Control Sequence of Operations.
4. Section 23 05 93 – Testing, Adjusting and Balancing.

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1.7 CODES AND STANDARDS

A. Work, materials, and equipment shall comply with the most restrictive of local, state, and federal authorities' codes and ordinances or these plans and specifications. At a minimum, the installation shall comply with current editions in effect 30 days prior to receipt of proposals of the following codes:
   1. National Electric Code (NEC).
   2. International Building Code 2021 (IBC).
      a. Section 717 Ducts and Air Transfer Openings.
      b. Section 907 Fire Alarm and Detection System.
      c. Chapter 28 Mechanical Systems.
   3. International Mechanical Code 2021 (IMC).
   4. International Energy Conservation Code 2015 (IECC).
   5. ASHRAE/ANSI 135: Data Communication Protocol for Building Automation and Control System (BACnet).
   6. UL 916 Underwriters Laboratories Standard for Energy Management Equipment.

1.8 SUBMITTALS

A. Shop Drawings:
   1. The ACS Contractor shall submit engineered drawings, control sequences, and bill of materials for approval.
   2. Drawings shall be submitted in the following standard sizes:
      a. 8.5” x 11”.
      b. 8.5” x 14”.
      c. 11” x 17”.
   3. Provide a minimum of two (2) paper copies and electronic PDF of submittal drawings for approval. Exact number of submittal drawings or electronic versions shall be determined at pre-construction meeting.

B. System Documentation, Product Data, and Samples (At a minimum, submit the following):
   1. ACS network architecture diagrams including all nodes and interconnections in simple block format.
   2. System schematics, sequences, and flow diagrams.
   3. Detailed Bill of Material list for each system or application, identifying quantities, part numbers, descriptions, and optional features.
   4. Details of all ACS interfaces and connections to the work of other trades.
   5. Product data sheets or marked catalog pages including part number, photo and description for all products including software.
   6. Manufacturer’s instructions and drawings for installation, maintenance, and operation of all purchased items.
   7. Proposed locations of all ACS control panels, relay panels, devices, and the like.

1.9 PROJECT MANAGEMENT

A. The ACS Contractor shall assign one project manager that shall manage and coordinate all ACS work through project completion.

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B. The ACS Contractor shall provide a detailed project design and installation schedule with time markings and details for hardware times. Schedule shall show all the target dates for transmission of project information and documents and shall indicate timing and dates for system installation, debugging, and commissioning.

C. The ACS Contractor schedule shall be seamlessly coordinated with Contractor for all required coordination with sub-contractors such as mechanical, electrical, TAB, and Commissioning.

1.10 RECORD DOCUMENTATION

A. Operation and Maintenance Manuals - Three (3) paper copies of the Operation and Maintenance Manuals shall be provided to the Owner's Representative upon completion of the project. The entire Operation and Maintenance Manual shall be furnished on Compact Disc, DVD, or flash media, and include the following for the ACS provided:
   1. Table of contents.
   2. As-built system record drawings. PDF record drawings shall represent the as-built condition of the system and incorporate all information supplied with the approved submittal. Drawings shall indicate location of all controlled equipment, ACS equipment controllers, control panels, sensors, fan and interlocking relays, actually installed ACS communication cabling routing, secondary control wiring, power source locations, and the like.
      a. Module Drawing:
         1) Provide an electronic wiring diagram of each control module (As shown in submittal documentation). Diagram shall display wiring schematic and terminations to end devices.
         2) Diagram shall display each input and output terminals and label those that are used for the control application.
      b. Equipment Schematic:
         1) Provide an electronic equipment schematic for each piece of mechanical equipment.
         2) The schematic shall display all mechanical equipment characterizes including fans, dampers, sensors, and other applicable control devices.
         3) The schematic shall show wiring terminations to each control device as shown in the submittal and as built documentation.
         4) Control devices shall be labeled by a symbol that can easily be identified in a bill of material that is shown on this graphic. The mill of material shall show the device symbol, description, manufacturer, and part number.
      c. <u>As-build schematic drawings shall be provided locally at each control device and paper copy affixed to control enclosure such as local control panels, VAC control panels, and the like.</u>
   3. Manufacturer’s product data sheets or catalog pages for all products including software.
   4. System Operator’s manuals.
   5. ACS network diagrams.
   6. Complete copy of approved Submittals.

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7. Electronic Parts Reference: Contractor shall have a website that has PDF files for products installed for this project. PDF files shall consist of product cut sheets, installation manuals, and maintenance instructions for future reference. This website shall include not only ATC hardware, but all control peripheral devices including: relays, current switches, temperature sensors, actuators, power supplies, and other components supplied for this project.

1.11 WARRANTY

A. Standard Material and Labor Warranty:
1. Provide a one-year labor, travel, material warranty on the complete ACS.
2. If within twelve (12) months from the date of Substantial Completion, upon written notice from the Owner, it is found to be defective in operation, workmanship or materials, it shall be replaced, repaired or adjusted at the option of the ACS Contractor at the cost of the ACS Contractor.
3. Maintain an adequate supply of materials within 24-hours of project site.

PART 2 - PRODUCTS

2.1 GENERAL DESCRIPTION

A. The ACS shall consist of the following:
1. Temperature control through digital programmable thermostats with remote access through WIFI connections.
2. Moisture/ventilation control through dehumidifiers with dew point controller.
3. Time clocks.
4. Exhaust control through time clock, occupancy sensors and 2-speed controller.

2.2 MISCELLANEOUS DEVICES

A. Local Control Panels:
1. All control panels shall be factory constructed, incorporating the ACS manufacturer’s standard designs and layouts. All control panels shall be UL inspected and listed as an assembly and carry a UL 508 label listing compliance. Control panels shall be fully enclosed, with perforated sub-panel, hinged door, and slotted flush latch.
2. In general, the control panels shall consist of the ACS controller(s), display module as specified and indicated on the plans, and I/O devices—such as relays, transducers, and so forth—that are not required to be located external to the control panel due to function. Where specified the display module shall be flush mounted in the panel face unless otherwise noted.
3. All I/O connections on the ACS devices shall be provide via removable or fixed screw terminals.
4. Low and line voltage wiring shall be segregated. All provided terminal strips and wiring shall be UL listed, 300-volt service and provide adequate clearance for field wiring.
5. All wiring shall be neatly installed in plastic trays or tie-wrapped.
6. A convenience 120 VAC duplex receptacle shall be provided at the control panel enclosure, on/off power switch, and required low voltage transformers.

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B. Power Supplies:
1. ACS power supplies shall be sized for the connected device load. Total rated load shall not exceed 75% of the rated capacity of the power supply.
2. Input: 120 VAC +10%, 60Hz.
3. Output: 24 VAC, 75-VA minimum.
4. Line Regulation: +0.05% for 10% line change.
5. Load Regulation: +0.05% for 50% load change.
6. Ripple and Noise: 1 mV rms, 5 mV peak to peak.
7. Provide all power supplies with integral circuit breaker type over current protection.
8. A power disconnect switch shall be provided next to the power supply.

PART 3 - PERFORMANCE / EXECUTION

3.1 INSTALLATION PRACTICES

A. ACS Wiring:
1. All conduit, wiring, accessories and wiring connections required for the installation of the HVAC Building Automation System, as herein specified, shall be provided by the ACS Contractor. All wiring and raceways shall comply with the requirements of applicable portions of Division 26 and all local and national electric codes, unless specified otherwise in this section.
2. All ACS wiring materials and installation methods shall comply with ACS manufacturer recommendations.
3. The sizing, type and provision of cable, conduit, cable trays, and raceways shall be the design responsibility of the ACS Contractor. If complications arise, however, due to the incorrect selection of cable, cable trays, raceways and/or conduit by the ACS Contractor, the Contractor shall be responsible for all costs incurred in replacing the selected components.
4. Class 2 Wiring:
   a. All Class 2 (24VAC or less) wiring shall be installed in conduit unless otherwise specified.
   b. Conduit is not required for Class 2 wiring in concealed accessible locations. Class 2 wiring not installed in conduit shall be supported every 4’ from the building structure utilizing metal hangers designed for this application. Wiring shall be installed parallel to the building structural lines. All wiring shall be installed in accordance with local code requirements.
   c. Color Coding: All control wiring for power or signal wiring shall have color coded wire insulators for each conductor in the bundle. Contractor shall provide wire bundles with sufficient conductors for each equipment application. Multiple parallel runs of cables to equipment is not allowed.
   d. Indoor Applications: All conduits located indoors shall be EMT (Electrical Metallic Tubing) type with steel compression fittings in exposed areas. Set screws are not allowed.
   e. Outdoor Applications: All conduits located outdoors shall be RGS or rigid aluminum pipe with water tight screw type connection for all wiring and conduit located outdoors requirements. Flexible metal conduit shall be used for vibration isolation and shall be limited to 3-feet in length when terminating to vibrating equipment. Flexible conduit outdoors

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shall be Seal-tight or approved equal of weather/liquid tight construction with approved fittings.

5. Class 2 signal wiring and 24-VAC power can be run in the same conduit. Power wiring 120-VAC and greater cannot share the same conduit with Class 2 signal wiring and shall be separated by at least 48 inches in all directions.
6. Provide for complete grounding of all applicable signal and communications cables, panels and equipment so as to ensure system integrity of operation. Ground cabling and conduit at the panel terminations. Avoid grounding loops.
7. Wire splices and/or extensions shall be made with screw type terminal block or solder with heat shrink tape. Use of wire nuts or solder-less crimp type connections will not be allowed.
8. All control conductors shall be labeled at terminations to equipment and controller indicating function.

B. ACS Line Voltage Power Source:
1. 120-volt electrical power circuits shall be provided by Electrical Contractor for dedicated ACS use at locations indicated on drawings. Refer to electrical drawings for circuit locations. ACS Contractor shall extend power from that location to end devices. All power wiring shall be installed in accordance with Division 26 Specification requirement and NEC latest addition. Circuits used for the ACS shall be dedicated to the ACS and shall not be used for any other purposes. Additional power circuits shall be provided by ACS Contractor, if required at ACS Contractors cost beyond what is indicated on Drawings.
2. Control power, whether it be 24-volt, or 120-volt, should be delivered to each piece of mechanical equipment, dampers, and/or control panels whether or not it is specifically indicated on the Contract Drawings.
3. It is the Contractor’s responsibility to include in his or her proposal all costs in connection with control wiring, and/or power, whether or not it is specifically indicated. Regardless of how large in nature or how incidental, no additional compensation will be approved by the Owner’s representative or Design Professionals concerning a failure on the Contractor’s part to include these costs in his proposal or a failure on the Contractor’s part to properly coordinate these important functions.
4. Unit Controller Power: AHU units shall be provided with 24-vac transformer provided by manufacturer integral to equipment.

C. ACS Raceway:
1. All line voltage wiring and all low voltage wiring concealed in walls, crawl spaces, or above inaccessible ceilings, shall be installed in conduit or raceway. Minimum control wiring conduit size 1/2”.
2. All line voltage wiring and all low voltage wiring exposed in mechanical rooms, shall be installed in conduit or raceway. Minimum control wiring conduit size 1/2”.
3. Where it is not possible to conceal raceways in finished locations, surface raceway (Wiremold) may be used as approved by the Owner and Engineer.
4. All conduits and raceways shall be installed level, plumb, at right angles to the building lines and shall follow the contours of the surface to which they are attached.
5. Flexible Metal Conduit shall be used for vibration isolation and shall be limited to 3 feet in length when terminating to vibrating equipment. Flexible Metal

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Conduit may be used within partition walls. Flexible Metal Conduit shall be UL listed.

6. Electrical Contractor shall provide junction boxes and conduits in walls with pull strings for use by ACS for wall mounted sensors at locations indicated on drawings. ACS Contractor shall coordinate with Electrical Contractor and shall provide any additional raceways and junction boxes that may be needed not indicated on drawings.
7. HVAC contractor shall provide control raceways between AHU/ACCU-E-1 as follows:
   a. Indoors: Galvanized steel EMT with compression fittings.
   b. Outdoors: Galvanized steel RGS pipe with threaded connections.

D. Penetrations:
1. Provide fire stopping for all penetrations through fire rate barriers used by dedicated ACS conduits and raceways.
2. All openings in fire proofed or fire stopped components shall be closed by using approved fire resistive sealant.
3. All wiring passing through penetrations, including walls shall be in conduit or enclosed raceway.
4. Penetrations of floor slabs shall be by core drilling. All penetrations shall be plumb, true, and square.

E. ACS Identification Standards:
1. Node Identification: All nodes shall be identified by a permanent label fastened to the enclosure. Labels shall be suitable for the node location. Cable types specified in Item A above shall be color coded for easy identification and troubleshooting.
2. Label all controllers and panels.
3. Labels for ACS panel enclosures, cabinets, ceiling grid system, and all other exposed areas shall be constructed of laminated plastic. Laminated plastic shall be minimum 1/8” thick sized appropriately to mark label easy to read when installed. Provide black letters with light contrasting background color. Secure labels in place with permanent adhesive, screws, or rivets.

F. ACS Panel and Unit Controller Installation:
1. The ACS panels and cabinets shall be located as indicated at an elevation of not less than 30 inches from the bottom edge of the panel to the finished floor. Each cabinet shall be anchored per the manufacturer’s recommendations.
2. The ACS Contractor shall be responsible for coordinating panel locations with Engineer and Owner prior to installation.
3. All ACS control components shall be installed in protective panel or cabinet enclosures. ACS panels and cabinets shall be NEMA 1 rated painted steel for indoor applications and NEMA 4X stainless steel or UV resistant plastic for outdoor applications.
4. ACS Unit Controllers: Coordinate location of all controllers and panels with Owner prior to installation.

G. HVAC Input Devices – General:
1. All Input devices shall be installed per the manufacturer’s recommendation.
2. Locate components of the ACS in accessible local control panels wherever possible.

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H. HVAC Output Devices:
1. All output devices shall be installed per the manufacturer's recommendation. The Mechanical Contractor shall install all in-line devices such as control valves, dampers, airflow stations, pressure wells, etc.

3.2 TRAINING

A. Training:
1. The Contractor shall provide training to Owner personnel on site with the actually installed and fully commissioned systems.
2. Beyond the first year following Final Completion ACS Contractor shall provide unlimited training for the life of the system via webinars, training videos, remote training classes, and the like. All services shall be free of charge to Owner. Owner will be responsible for travel, lodging and food expenses.

3.3 COMMISSIONING

A. Contractor shall fully commission all aspects of the HVAC Automatic Control System (ACS) and shall coordinate commissioning requirements with Commissioning Provider provided by Owner. ACS Contractor shall meet with Commissioning Provider and review commissioning plan and confirm project requirements.

B. Startup Testing: Complete startup testing to verify operation control system before notifying Owner of system demonstration. Provide Owner with schedule for startup testing. Owner may have representative present during any or all startup testing.

C. Prepare a log documenting startup testing of each input and output device, with technician's initials and date certifying each device has been tested and calibrated. This document shall indicate proof that the following functions have been commissioned. Include this information in the as-built document:
1. Short to ground check, Point to point, Equipment reaction, Equipment location correct, Signal type, Verify damper actuator operation, Verify interlocks and shutdowns.
2. Verify that control wiring is properly connected and freed of shorts and ground faults. Verify that terminations are tight.
3. Enable control system and verify each input device's calibration. Calibrate each device according to manufacturer's recommendations.
4. Verify that binary output devices such as relays, two-position actuators, and magnetic starters operate properly and those normal positions are correct.
5. Verify that analog output devices such as I/Ps and actuators are functional, that star and span are correct, and that direction and normal positions are correct.
6. Verify that system operates according to sequences of operation. Simulate and observe each operational mode by overriding and varying inputs and schedules.
7. Alarms and Interlocks:
   a. Check each alarm with an appropriate signal at a value that will trip the alarm.
   b. Trip interlocks using field contacts to check logic and to ensure that actuators fail in the proper direction.

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c. Test interlock actions by simulating alarm conditions to check initiating value of variable and interlock action.

D. Commissioning Requirements:
1. Control system shall be set up and checked by factory trained competent technicians skilled in the setting up and adjustment of the ACS equipment used in this project. This technician is to be experienced in the type of HVAC system associated with this project.
2. After completion of the commissioning, this contractor will demonstrate the sequence of operations for each system to the Mechanical Engineer or Owner as directed.
3. Equipment checkout sheets are to be produced by this contractor showing checkboxes of complete and operations system. Sheets shall be edited for project and submitted to Engineer before start of commissioning work for approval.

E. Control System Demonstration and Acceptance:
1. Demonstration: Prior to acceptance, perform the following performance tests to demonstrate system operation and compliance with specification after and in addition to system commissioning. Provide Engineer with log documenting completion of startup tests.
a. Engineer will be present to observe and review system demonstration. Notify engineer at least 10 days before system demonstration begins.
b. Demonstrate actual field operation of each sequence of operation as specified in sequence of operations. Provide at least two persons equipped with two-way communication. Provide laptop computer with wireless remote internet access for live interaction with Web Server during system commissioning and demonstrations. Demonstrate calibration and response of any input and output points requested by engineer. Provide and operate test equipment required to prove proper system operation.
c. Demonstrate System Performance:
1) Demonstrate compliance with sequence of operation through each operational mode.
2) Demonstrate complete operation of operator interface.
3) Tests that fail to demonstrate proper system operation shall be repeated after contractor makes necessary repairs or revisions to hardware or software to successfully complete each test.
d. Acceptance:
1) After tests described in this Specification are performed to the satisfaction of both Engineer and Owner, Engineer will accept control system as meeting completion requirements. Engineer may exempt tests from completion requirements that cannot be performed due to circumstances beyond contractor’s control. Exempted tests shall be performed as part of warranty.
2) System shall not be accepted until completed demonstration forms and checklists are submitted and approved.

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PART 4 - EQUIPMENT SEQUENCE OF OPERATIONS

4.1 Refer to Specification Section 23 09 93.

END OF SECTION 23 09 00

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SECTION 23 09 23 – AUTOMATIC CONTROL SYSTEM COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. ACS system shall be provided to control HVAC systems. The following specification shall assist in the coordination between trades.

1.2 SCOPE OF WORK

A. Wall Mounted ACS Control Devices: Electrical Contractor shall provide rough in (junction box and conduit to above ceiling) for sensors as locations indicated on drawings. ACS shall provide and install all control sensors with wiring for a complete installation. ACS Contractor shall provide additional work as needed above and beyond what is provided by Electrical Contractor for a complete system.

B. AHU/ACCU-E-1: ACS contractor shall install both raceways and control conductors as needed to connect AHU to outdoor ACCU.

C. Roof Mounted Exhaust Fans:
1. Electrical Contractor shall provide 120-vac power to control panels at locations indicated on drawings
2. HVAC/ACS/Electrical Contractor shall work together to accomplish the work indicated by schematic 4, Sheet M6.2.

D. Electrical Contractor General Requirements:
1. Electrical Contractor shall provide junction boxes and conduit in walls with pull strings for all wall mounted ACS devices at locations indicated on Drawings. ACS Contractor shall provide devices and wire sensors back to ACS.
2. Electrical Contractor shall provide 120-vac power to ACS control panels located in the restrooms.
3. Electrical Contractor shall provide relays and raceway from occupancy sensors to control panels in the restroom with 2-spee fans.

END OF SECTION 23 09 23

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SECTION 23 09 93 - EQUIPMENT CONTROL SEQUENCE OF OPERATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. HVAC equipment sequence of operations for the High School Stadium Improvements, Calallen ISD, Corpus Christi, Texas.

PART 2 - EQUIPMENT SEQUENCE OF OPERATIONS

2.1 HVAC AUTOMATIC CONTROL SYSTEM (ACS)

A. System shall energize and de-energize each component of HVAC system individually. Equipment shall operate on a predetermined schedule.

B. Occupied Mode: The Occupied mode shall be on a totally programmable time schedule through ACS device. HVAC system shall operate to maintain space thermal and moisture conditions and ventilation rates.

C. Unoccupied Mode: The Unoccupied mode shall be on totally programmable time schedule. HVAC system shall operate to maintain space thermal and moisture conditions and ventilation rates for the purposes of set-back environment.

2.2 TESTING AND CALIBRATION

A. After completion of installation, all controls shall be tested and calibrated to operate as required in this specification.

B. Upon request by the Engineers' representative, demonstration of proper control system operation shall be provided prior to final job acceptance.

C. ACS Contractor shall coordinate testing with project Commissioning Provider as needed.

2.3 GENERAL

A. Indoor Conditions:
   1. Occupied:
      a. Cooling: 74 degrees F. (adj.)
      b. Heating: 68 degrees F. (adj.)
      c. Humidity: 55% RH maximum.
   2. After hours and Unoccupied Periods:
      a. Cooling: 81 degrees F. (adj.); 5 degree dead band.
      b. Heating: 55 degrees F. (adj.) 5 degree dead band.
      c. Humidity: 58% RH maximum.

B. All unit operations such as dead bands, offsets, and the like shall meet the minimum requirements of the 2015 International Energy Conservation Code.

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C. Occupancy Schedules: Provide schedules through digital programmable thermostat and occupancy sensors.

D. Air Balance:
1. Test, Adjust, and Balance services shall be provided by General Contractor through sub-contract with licensed TAB firm. ACS Contractor shall not include the cost of TAB in their proposal. ACS Contractor shall coordinate work with TAB Contractor as if they were their own direct sub-contractor.
2. ACS Contractor shall obtain TAB reports for project and shall base ACS setpoints on TAB report requirements as starting project baseline.
3. ACS Contractor shall update system setpoints as needed with TAB Contractor for system fine tuning.
4. TAB Contractor shall include ACS coordination setpoints on final TAB reports.

2.4 DIRECT EXPANSION “DX” AHU/ACCU-E-1

A. The unit shall consist of a filter section, direct expansion cooling coil, electric re-heating coil, supply fan, condensing unit with cooling only 2-stage compressor, freeze thermostat, condensate drain safety float and digital programmable thermostat.

B. Occupied Mode:
1. Occupied Mode shall be enabled through the individual time schedule in the digital programmable thermostat.
2. Supply Fan: Fan shall cycle with load and vary the fan speed as needed based on cooling and heating load.
3. Cooling Mode:
   a. Stage 1-Low Cool: Upon a call for cooling “Y1”, the supply fan shall ramp up to Stage 1 cooling air volume and the compressor shall start unloaded.
   b. Stage 2-High Cool: Upon a continued call for cooling “Y2”, the supply fan shall ramp up to Stage 2 cooling air volume and the compressor shall operate at 100% of cooling capacity.
   c. System shall stage down in reverse order.
4. Heating Mode:
   a. Stage 1-Low Heat: Upon a call for heating “W1” the supply fan shall ramp up to Stage 2 Cooling air volume and the electric reheater shall start with Stage 1 heating.
   b. Stage 2-High Heat: Upon a continued call for heating “W2” the supply fan shall ramp up to Stage 2 Cooling air volume and the electric reheater shall start with Stage 2 reheating.
   c. System shall stage down in reverse order.

C. Unoccupied Mode: The system shall be enabled same as the occupied mode but the supply fan shall cycle with load, and the cooling and heating shall be enabled but with afterhours setback setpoints.

D. Alarms and Safeties: ACS shall wire evaporator freeze thermostat and condensate drain overflow switch provided by Mechanical Contractor in series and wire to the common control wiring going to the condensing unit to disable the compressor upon activation. Alarm shall not impact the supply fan for continuous operation.

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2.5 PACKAGED TERMINAL AIR CONDITIONING UNITS PTAC EZ42/DR

A. The unit shall consist of a filter section, direct expansion cooling coil, electric re-heating coil, 2-speed manual supply fan, condensing unit with cooling only single compressor, and remote digital thermostat with IR occupancy sensor.

B. Supply Fan Speed: The supply fan shall operate at high or low speed manually set at the thermostat. The system shall be setup for default low speed.

C. Occupied Mode – Heating and Cooling:
   1. Occupied Mode shall be enabled through the IR occupancy sensor built into the digital thermostat. Sensor shall automatically enable occupied mode upon sensing motion in the room. PTAC-1 and 2 (IDF and Electrical Rooms): Disable the IR feature and allow the system to operate in occupied mode 24/7.
   2. Cooling Mode: The supply fan, condenser fan and compressor shall start and cycle as needed to maintain the space temperature cooling setpoint.
   3. Heating Mode:
      a. The supply fan shall start and the heating stages enabled as needed to maintain the space temperature heating setpoint.
      b. 2-Stage Heating: If the thermostat does not have a 2-stage option, provide a 10-minuted adjustable delay on make timer for stage 2 heat strip control.

D. Unoccupied Mode – Heating and Cooling:
   1. Occupied Mode shall be enabled through the IR occupancy sensor built into the digital thermostat. Sensor shall automatically enable unoccupied mode upon sensing no motion in the room for 30-minutes (adj.). PTAC-1 and 2 (IDF and Electrical Rooms): Disable the IR feature and allow the system to operate in occupied mode 24/7.
   2. The cooling and heating shall be enabled but with afterhours setback setpoints.

E. Model EZDR, PTAC-7 Only: This unit shall enable the internal ventilation system (fans and compressor) as needed to provide dehumidified/tempered ventilation air at a continuous rate 24/7 regardless of the IR occupancy sensor status.

F. Temperature Limits: Each digital thermostat shall be programmed with administrative privileges to not allow the users to adjust the space temperature setpoint beyond the following limits on occupied mode:
   1. Cooling below 70 F, adjustable.
   2. Heating Above 72 F, adjustable.

2.6 TWO SPEED EXHAUST FANS, CONTROL TYPE “A AND B” – TEMPERATURE AND OCCUPANCY

A. The unit shall consist of an exhaust fan with 2-speed controller, space mounted thermostat and space mounted occupancy sensor(s).

B. Occupied Mode:
   1. The fan shall operate 24/7.

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2. Speed 1 – Low: The fan shall operate at low speed until such time the space temperature drops below 40 F and the fan shall be disabled. Upon a rise in space temperature 3 F above setpoint, the fan shall restart in low speed.
3. Speed 2 – High: The fan shall operate in high speed upon activation of any one space occupancy sensor furnished by the Electrical contractor, relay closure. Upon sensing no occupancy and the relay open, the fan shall return to low speed 1.

2.7 SINGLE SPEED EXHAUST FANS, CONTROL TYPE "A" – TEMPERATURE CONTROL

A. The unit shall consist of an exhaust fan with single speed on board speed controller and high voltage space mounted thermostat.

B. Occupied Mode:
1. The fan shall operate 24/7.
2. The fan shall operate until such time the space temperature drops below 40 F and the fan shall be disabled. Upon a rise in space temperature 3 F above setpoint, the fan shall restart.

2.8 SINGLE SPEED EXHAUST FANS, CONTROL TYPE "B" – OCCUPANCY CONTROL

A. The unit shall consist of an exhaust fan with single speed on board speed controller and high voltage space mounted occupancy sensor.

B. Occupied Mode: The fan shall operate upon activation of space occupancy sensor furnished by the Electrical contractor through high voltage power connection. Upon sensing no occupancy and the relay open, the fan shall disable operation.

END OF SECTION 23 09 93

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SECTION 23 21 14 - REFRIGERANT AND EQUIPMENT DRAIN PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes systems, accessories, valves, pipe, and pipe-fittings for refrigerant and equipment drain piping.

1.2 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified, provide compatible system components and joints. Provide flanges, union, and couplings at locations requiring servicing.

B. Use unions, flanges, and couplings downstream of valves and at equipment or apparatus connections. Use non-conducting dielectric connections whenever jointing dissimilar metals. Do not use direct welded or threaded connections to valves, equipment or other apparatus.

C. Provide pipe hangers and supports in accordance with ASME B31.1 ASME B31.9.

D. Refrigerant Liquid Indicators:
1. Use line size liquid indicators in main liquid line leaving condenser.
2. When receiver is provided, install in liquid line leaving receiver.
3. Use line size on leaving side of liquid solenoid valves.

E. Permanent Filter-Dryers:
1. Use in low temperature systems.
2. Use in systems utilizing hermetic compressors.
3. Use filter-dryers for each solenoid valve.

1.3 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Shop Drawings: Submit schematic layout of refrigeration system, including equipment, critical dimensions, and sizes.

C. Product Data: Submit data on pipe materials, pipefittings, valves, and accessories. Submit manufacturers catalog information. Indicate valve data and ratings.

D. Design Data: Indicate pipe size. Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with ASME B31.1, B31.9 code for installation of piping systems and ASME SEC IX for welding materials and procedures.

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1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system Protect.

D. Dehydrate and charge refrigeration components including piping and receivers, seal prior to shipment. Maintain seal until connected into system.

1.6 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 EQUIPMENT DRAINS AND OVERFLOWS

A. Copper Tubing: ASTM B88, Type L, hard drawn.
   1. Fittings: ASME B16.18, cast brass, or ASME B16.22 solder wrought copper.
   2. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees F. (220 to 280 degrees C.).

B. Plastic Drain Pans: If the unit drain pan is constructed of PVC or other plastic material, the condensate drain piping shall be constructed of schedule 40 PVC with solvent welds at the last 3-4 feet of the connection to the unit to prevent stress on the drain pan connection.

2.2 REFRIGERANT PIPING

A. Copper Tubing: ASTM B280, Type L ACR hard drawn.
   1. Fittings: ASME B16.22 wrought copper. All fittings shall be long radius type.
   2. Joints: Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees F.; SIL-FOS 15 or equal.

2.3 UNIONS, FLANGES, AND COUPLINGS

A. Unions for Pipe 2 inches (50 mm) and Under:
   1. Ferrous Piping: 150 psig (1034 kPa) malleable iron, threaded.
   2. Copper Pipe: Wrought copper, soldered joints.

2.4 PIPE HANGERS AND SUPPORTS

A. Refer to Section 23 05 29 – Hangers, Supports, and Foundations.

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2.5 REFRIGERATION MOISTURE AND LIQUID INDICATORS

A. Manufacturers:
1. Alco Controls Model AMI.
2. Danfoss.
3. Parker.
4. Emerson.
5. Mueller Brass Company Model Vuemaster.
6. Substitutions: Section 23 05 00 – Mechanical General Conditions.

B. Indicators:
1. Single port type, UL listed.
2. Copper or brass body, flared or solder ends.
3. Sight glass, color-coded paper moisture indicator with removable element cartridge and plastic cap.
4. Maximum working pressure of 500 psig.
5. Maximum temperature of 200 degrees F. (93 degrees C.).

2.6 REFRIGERATION FILTER-DRIERS

A. Manufacturers:
1. Alco Controls Model ADKS.
2. Sporlan Valve Company Model Catch-All.
3. Emerson.
4. Substitutions: Section 23 05 00 – Mechanical General Conditions.

B. Replaceable Cartridge Angle Type:
1. Shell: ARI 710, UL listed, brass or epoxy painted steel, removable cap with gauge service port, for maximum working pressure of 500 psig outside diameter size connections.
2. Filter/Dryer Cartridge: Solid core desiccant media with activated alumina and filtration down to minimum 10 microns.

C. Permanent Straight Through Type:
1. ARI 710, UL listed, steel shell with molded desiccant filter core, for maximum working pressure of 500 psig.
2. Minimum Size: 163 (16 cubic inches)

2.7 FIRE STOP SYSTEMS

A. General Purpose Fire Stopping Sealant:
1. Manufacturers:
   a. 3M Model 2000.
   b. Spec Seal Model 100.
   c. Hilti.
2. Water based, nonslumping, premixed sealant with intumescent properties, rated for 3 hours per ASTM E814 and UL 1479.

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PART 3 - EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.2 INSTALLATION

A. Install refrigerant piping in accordance with ASME B31.5 and equipment manufacturer's instructions. Confirm pipe sizing, routing, use of valves and accessories, and installation methods required by manufacturer prior to installation. Submit shop drawings of proposed layout for engineer's review.

B. Condensate drain piping shall be sloped from equipment to drain termination location with minimum 1/8"/foot continuous downward slope. Provide minimum 1" air gap above termination a plumbing receptor.

C. Route piping parallel to building structure and maintain gradient.

D. Install piping to conserve building space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Sleeve pipe passing through partitions, walls and floors.

G. Provide fire stop sealant around all piping penetrations through fire rated barriers.

H. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 23 05 48 – Mechanical Sound, Vibration, and Seismic Control.

I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 23 05 29 – Hangers, Supports, and Foundations.

J. Provide access where valves and fittings are not exposed.

K. Arrange refrigeration piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.

L. Flood refrigerant piping system with nitrogen when brazing at all times.

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M. Plug or cap refrigerant piping during construction when work is not being performed on piping. Evacuate air from piping or provide positive pressure nitrogen charge.

N. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

O. Prepare unfinished pipe, fittings, supports, and accessories, ready for finish painting.

P. Insulate piping and equipment; refer to Section 23 07 00 – Mechanical Insulation.

Q. Follow ASHRAE 15 procedures for charging and purging of systems and for disposal of refrigerant.

R. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.

S. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator. Locate downstream of expansion valve sensing bulb.

T. Fully charge completed system with refrigerant after testing.

3.3 FIELD QUALITY CONTROL FOR REFRIGERANT PIPING SYSTEMS

A. Test refrigeration system in accordance with ASME B31.5.

B. Pressure test system with dry nitrogen to 200 psig. Check all fittings and joints for leaks. Evacuate system down to 2,000 microns and brake system with nitrogen. Evacuate system down to below 350 microns and close off system valves. If system maintains vacuum below 500 microns for 1-minute minimum hold, system is ready for charging. If system fails evacuation procedures, perform remedial repairs and repeat evacuation process.

C. Owner shall observe system evacuations for quality control purposes. Contractor shall coordinate work with Owner prior to start of evacuations and system charging.

D. Follow manufacturer’s installation instructions. Inform Engineer if manufacturer’s procedures deviate from specification requirements. Contractor is required to perform evacuation procedures listed in this specification if requirements are more stringent than manufacturer’s minimum requirements.

E. Test to no leakage.

END OF SECTION 23 21 14

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SECTION 23 31 13 - DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes metal ductwork, nonmetallic ductwork and casing and plenums.

1.2 PERFORMANCE REQUIREMENTS

A. No variation of duct configuration or sizes other than those of equivalent or lower loss coefficient is permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

B. Seal ductwork in accordance with ASHRAE 90.1 and International Energy Conservation Code - 2015 standards and as described herein.

1.3 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Coordination Drawings: Indicate duct fittings, gages, sizes, welds, and configuration for all systems.

C. Product Data: Submit data for duct materials duct liner and duct connectors.

D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA HVAC Air Duct Leakage Test Manual.

1.4 CLOSEOUT SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and flexible.

B. Construct ductwork to NFPA 90A NFPA 90B and NFPA 96 standards.

C. Materials: Flame spread / smoke developed rating of 25/50 in accordance with ASTM E84, NFPA 255, UL 723.

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1.6 QUALIFICATIONS

A. Installer: Company specializing in performing Work of this Section with minimum three (3) years documented experience.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 DUCT MATERIALS

A. Galvanized Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet, lock-forming quality, having G90 zinc coating in conformance with ASTM A90.

B. Fasteners: Rivets, bolts, or sheet metal screws of same construction as the duct system.

C. Rectangular Duct Connection System:
1. All duct connection shall be flanged type with full gasket and cleats per SMACNA requirements per application. The flanges shall be formed from the duct wall and shall have an integral mastic which allows the flange to seal itself to the duct. Corner pieces shall be used to add rigidity to the flange, hold the duct together and provide a sealing surface for the gasket. The gasket shall serve as a seal between the flanges. The cleat shall insure even compression of the gasket along the length of the flange. For weatherproof duct connection, install a full-length, one piece cleat to the top duct flange to prevent water from collecting on the gasket.
2. Where space is limited for low pressure duct applications, low profile slip type drive may be allowed as approved by Engineer. Contractor shall coordinate slip drive applications with Engineer.

D. Round Duct Systems: All round duct system shall have spiral lock-seam construction.

E. Hanger Rod: ASTM A36; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

F. Sealant:
1. Manufacturers / Product:
   a. Rector Seal / Air-Lock 181.
   b. Carlisle CCW1-181.
   c. Design Polymerics DP 1020.
2. Non-hardening, Non-flammable; water-based; fiber reinforced; mildew, water and U.V. resistant; compatible with mating materials; UL listed 181A or 181B; liquid used alone or with tape or heavy mastic.

G. General Purpose Fire Stopping Sealant (Refer to Architectural Sections):
1. Manufacturers:
   a. 3M Model 2000.
   b. Spec Seal Model 100.

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c. Hilti.

2. Water based, red color, non-slumping, premixed sealant with intumescent properties, rated for three (3) hours per ASTM E814 and UL 1479.

2.2 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings. Furnish duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Reinforcing: All rectangular duct systems shall be externally reinforced in accordance with SMACNA requirements based on system pressure class and duct construction chosen. Internal reinforcing is not allowed and may be considered on special occasions with prior approval from Engineer.

C. Construct Tees, bends, and elbows with minimum radius 1-1/2 times centerline duct width. Where not possible and where rectangular elbows are used, provide airfoil turning vanes. Where acoustical lining is indicated, furnish turning vanes of perforated metal with glass fiber insulation for auditoriums, band halls, recording studios, TV stations and the like. Refer to the acoustical consultants design requirements as applicable.

D. Round ductwork in secondary supply and constant volume supply, return, outside air and exhaust systems shall be constructed with spiral duct construction.

E. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

F. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.

G. On rectangular ductwork provide standard 45 degree lateral wye takeoffs. When space does not allow 45 degree lateral wye takeoff, use 90 degree conical tee connections.

2.3 INSULATED ROUND FLEXIBLE DUCTS

A. Manufacturers:
1. Flexmaster USA, Inc. Model 1M.
2. Thermaflex.

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B. Duct shall be constructed of a polyethylene fabric mechanically locked by helical wound galvanized steel. The fabric shall be mechanically locked to the steel helix without the use of adhesives or chemicals. Cover the insulation with a fire-retardant metalized vapor barrier jacket reinforced with crosshatched scrim having a permeance of not greater than 0.05 perms when tested in accordance with ASTM E96, Procedure A.
1. Pressure Rating: 10.0 inches wg positive and 5.0 inches wg negative.
2. Maximum Velocity: 4000 fpm.
3. Temperature Range: -20 degrees F. to 250 degrees F.
4. Vapor Barrier Permeance: Minimum 0.05 perm ASTM E96, Procedure A.
5. R-value: Minimum of 6.

C. The insertion loss (dB) of a 6 foot length of straight duct when tested in accordance with ASTM E477, at a velocity of 1000 feet per minute, shall be at least:

Octave Band	2	3	4	5	6	7
Hz.	125	250	500	1000	2000	4000
8” diameter	26	27	27	31	32	27
10” diameter	21	27	25	32	39	24
12” diameter	22	27	24	31	31	20

2.4 SINGLE WALL ROUND DUCTS – SPIRAL

A. Manufacturers:
1. Spiral Pipe of Texas.
2. United McGill. Uni-Seal.
3. Gowco.
4. Semco.
5. Duct Direct.

B. Round spiral lock-seam duct with galvanized steel wall. Fittings to be spot welded and bonded, factory fabricated. Access doors to be pressure-relief style with insulated frame and door.

C. 90 degree elbows shall consist of not less than five (5) gores and 45 degree elbows shall consist of not less than three gores. All elbows 8" diameter and less may be die-formed longitudinally welded type with centerline radius not less than 1 1/2 times the duct diameter. Tees shall be 90 degree "Lo Loss" tee taps. Register taps shall be boot taps welded to spiral lock-seam duct. Duct fittings shall be factory fabricated. Shop or field fabricated duct fittings will not be accepted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify sizes of equipment connections before fabricating transitions.

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3.2 INSTALLATION

A. Duct sizes shown on Plans are inside clear dimensions. For lined ducts, maintain sizes inside lining.

B. Contractor Coordination Drawings – Provide contractor coordination drawings in accordance with Section 23 05 05 – Submittals.

C. Install ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, Second Edition –1995 with Addendum No.1 November 1997.

D. Duct systems shall be installed so as to be freely floating. Ducts shall be securely supported from structure but shall be able to expand and contract independently of structure without causing undue stress or damage to the duct system. Ductwork shall not support itself. Support duct systems in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, Second Edition –1995 with Addendum No.1 November 1997 or newer, Chapter 4. Attachments to structure shall not damage or alter the structural integrity of the structural systems. Contractor shall coordinate installations with Structure Engineer of record on project.

E. Building Duct Penetrations and Sleeves:
   1. Contractor shall provide sleeves at all building penetrations “Wall, Floors and Roofs” with sufficient room for the installation of finished insulation products. Provide escutcheons at all duct wall/floor penetrations when exposed to view. Coordinate with Architect for new construction and with existing wall/floor types for existing facilities.
   2. Duct sleeves shall be installed with sealant and/or flashings as required to prevent air movement and sound transmission.
   3. All exterior penetrations shall be suitably weatherproofed air and water tight. All sealants shall be compatible with building system and shall be U.V. resistant.

F. Field verify all measurements and dimensions prior to fabrication of any ductwork. Notify engineer where duct sizes require modifications. No additional compensation will be awarded for modifications to fit field conditions.

G. Minor changes in duct routing and dimensions to avoid structural members and other obstructions will be allowed. Major departures from duct layout will require approval of the Owner’s representative.

H. Duct materials or prefabricated ductwork stored or installed at site shall be protected from weather, dust and moisture. Damaged duct shall be removed and replaced at the Contractor's expense.

I. During construction, install temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

J. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

K. Ductwork installed above inaccessible ceiling to have operable quadrants on balancing dampers.

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L. Use double nuts and lock washers on threaded rod supports.

M. Connect flexible ducts inner liner to metal ducts with operable stainless steel screw clamping bands. Tape outer liner and insulation to metal duct or adjacent insulation.

N. Flexible ducts shall be installed in a fully extended condition free of sags and kinks, using only the minimum length required to make the connection.

O. Set plenum doors 6 to 12 inches above floor. Arrange door swing so fan static pressure holds door in closed position.

P. Sleeve wall openings at all wall louvers installed by Mechanical Division.

Q. Seal openings in ducts where probes for TAB instruments are inserted.

R. All joints in spiral pipe and fittings shall be made using a sleeve type coupling, duct sealer, and duct tape. This shall consist of application of duct sealer to the male fitting, mechanically locking with a minimum of three (3) pop rivets or sheet metal screws for round duct and a minimum of six (6) pop rivets or sheet metal screws for oval duct, application of duct sealer to the outside of the joint to 2" width, and a single wrap of duct tape over the wet sealer. A minimum period of 24 hours shall elapse after installation before attempting leakage test.

S. Firestopping: Seal around all duct penetrations through fire barriers with fire stopping sealant. Provide fire dampers and smoke dampers as shown on Plans.

3.3 SEALING OF DUCTWORK

A. Seal ductwork, as a minimum, in accordance with ASHRAE 90.1 and IECC 2021 C403.12 requirements, and as required herein. All supply, return, and outside air duct shall be sealed as Class A and all exhaust duct shall be sealed as Class B, regardless of static pressure classification of system.
   1. Supply, return, and outside air: Seal all transverse joints, longitudinal seams, duct connections, and duct wall penetrations.
   2. Exhaust air: Seal all transverse joints, longitudinal seams and duct connections.
   3. Pressure-sensitive tape shall not be used as the primary sealant.

3.4 VERIFICATION OF MINIMUM GAUGES

A. Contractor shall be required to cut samples of materials from installed ductwork at five (5) locations as designated by Engineer prior to installation of insulation. Samples will be provided to Engineer for verification that gauges are in compliance with SMACNA standards and with minimum gauges as specified herein. If any sample is found not to be in compliance with Contract Documents, ductwork shall be replaced and an additional set of five samples shall be provided until it is determined that all ductwork is in compliance. Contractor shall patch ductwork where samples are taken. All ductwork found to be non-compliant shall be removed and replaced by Contractor at no expense to the Owner or Design Professionals.

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3.5 CLEANING

A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air flow, clean one half of system completely before proceeding to other half. Protect equipment with potential to be harmed by excessive dirt with temporary filters, or bypass during cleaning.

3.6 SCHEDULES

DUCTWORK MATERIAL SCHEDULE

AIR SYSTEM	MATERIAL
Secondary Supply Air Round and Rectangular	Galvanized Steel
Supply, Return, General Exhaust, Outside Air – Round & Rectangular	Galvanized Steel

DUCTWORK PRESSURE CLASS SCHEDULE

AIR SYSTEM	PRESSURE CLASS
Supply, Return, General Exhaust, Outside Air	2 inch wg

MINIMUM SHEET METAL GAUGES

Maximum Rectangular Duct Size Inches	U.S. Standard Gauges
Up to 12	26
13 – 30	24
31 – 48	22
49 – 54	20
55 and above	18

Maximum Round Duct Size Inches	U.S. Standard Gauges
Up to 14	26
15 – 26	24
27 – 36	22
37 – 50	20
51 and above	18

Ductwork must be reinforced in accordance with pressure class and SMACNA standard requirements.

END OF SECTION 23 31 13

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SECTION 23 33 01 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes back-draft dampers, duct access doors, fire dampers, volume control dampers, flexible duct connections, and duct test holes.

1.2 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, duct layout, and electrical characteristics and connection requirements.

C. Product Data: Provide literature that indicates dimensions, weights, capacities, ratings, air performance, and finishes of materials, and connection requirements. Provide manufacturer’s installation instructions.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.3 CLOSEOUT SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Project Record Documents: Record actual locations of access doors.

C. Operation and Maintenance Data: Submit for Combination Smoke and Fire Dampers.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

1.6 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.7 WARRANTY

A. Furnish one (1) year manufacturer warranty for duct accessories.

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1.8 EXTRA MATERIALS

A. Furnish two (2) of each size and type of fusible link.

PART 2 - PRODUCTS

2.1 BACKDRAFT DAMPERS: ROOF MOUNTED EXHAUST FANS

A. Manufacturers:
1. Ruskin Model S2SS (304 Stainless Steel)
2. Greenheck.
3. Philips.
4. Safe-Air.

B. Gravity Back-draft Dampers. Furnished with Air Moving Equipment: Air moving equipment manufacturers standard construction.

C. Multi-Blade, back-draft dampers (Square and Rectangular): Parallel-action, gravity-balanced, 304 stainless steel maximum 6 inch width. Frame shall have welded construction. Blades linked together in rattle-free manner with 90-degree stop. Provide corrosion resistant nylon bushings for smooth operation. Furnish dampers with adjustment device to permit setting for varying differential static pressure.

2.2 DUCT ACCESS DOORS

A. Manufacturers:
1. Ruskin.
2. Flexmaster.
3. Greenheck.
4. Philips.
5. Safe-Air.

B. General:
1. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.
2. Door material construction shall match the adjoining connecting duct systems; galvanized steel or stainless steel as applicable.

C. 2 Inch w.g. and less: Rigid and close fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, furnish double wall door with 1.5” insulation. Provide with stainless steel construction when used with stainless steel duct systems. Refer to duct construction schedules.
1. Ruskin Model ADC/H Series or equal.
2. Up to 18 Inches Square: Furnish with One (1) sash lock per side.
3. Up to 24 x 24 Inches: Furnish with Two (2) sash locks per side.
4. Access panels with sheet metal screw fasteners are not acceptable.

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D. Over 2-inch w.g.: Heavy gauge galvanized steel outer frame with continuous gasket, round self-sealing low leakage inner door, quick fastening latches, and cable. No raw edges shall be exposed. For insulated ductwork, furnish double wall door with 1.5" insulation. Provide with stainless steel construction when used with stainless steel duct systems. Refer to duct construction schedules.
   1. Access panels with sheet metal screw fasteners are not acceptable.
   2. Flexmaster Inspector Series.

2.3 FIRE DAMPERS

A. Manufacturers:
   1. Ruskin Model CFD, DIBD, FD series.
   2. Greenheck.
   3. Philips.
   4. Safe-Air.

B. Fabricate in accordance with NFPA 90A and UL 555, and manufacturer's condition of listing. Dampers shall be dynamic type. Dampers shall be equipped for ceiling, wall, or floor mounting.

C. Ceiling Dampers: Galvanized steel, 22-gage frame, and 16-gage flap, two layers 0.125-inch ceramic fiber on topside with locking clip. Provide radiation blanket on air device back pan. Provide extended neck sleeve.

D. Curtain Type Dampers:
   1. Galvanized steel with interlocking blades. Furnish stainless steel closure springs and latches for closure under airflow conditions. Configure with blades out of air stream except for 1.0-inch pressure class ducts up to 12 inches in height.
   2. If multiple dampers are required for larger duct sizes, Contractor shall increase the duct size at each damper at least 15% to and from dampers with fames in the air stream.

E. Airfoil Blade Dampers: Single piece, galvanized or stainless-steel construction as scheduled airfoil shaped blades of 14-gauge thickness, with stainless steel bearings, fusible link.

F. Leakage Rating: Class 1.

G. Fire Resistance Rating: 1 1/2 or 3 hour as indicated on Drawings.

H. Fusible Links: UL 33, separate at 160 degrees F with adjustable link straps for combination fire/balancing dampers.

I. Sleeve: Mount damper in integral factory fabricated steel sleeve. Duct-to-sleeve connection to be breakaway type.

J. Out of Wall Construction: Provide fire damper assemblies with out of wall type construction and additional fire blanket insulation as needed for out of the wall applications.

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K. Access: Provide each damper with duct access door at damper or removable duct section for full access to damper for service and maintenance. Access doors shall be provided with the largest size possible depending on the available duct space. Minimum access door size is 12”x12”. If duct area is limited and 12”x12” door will not fit, damper must be installed with flanged type easily removable duct section at damper connection.

2.4 GENERAL VOLUME CONTROL DAMPERS

A. Manufacturers:
1. Ruskin Model MD35, MDRS 25.
2. Greenheck.
3. Philips.
4. Safe-Air.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.

C. Multi-Blade Damper: Opposed blade pattern. Frame to be 16 gauge galvanized steel hat channel. Blades shall be single skin of 16 gauge galvanized steel with three longitudinal grooves for reinforcement. Maximum blade width of 8 inches. Linkage concealed in frame. ½ inch hex axle.

D. Round Damper: Fabricate of 20-gauge galvanized steel with 14-gauge butterfly damper blade, neoprene seal and stainless steel or nylon sleeve bearing.

E. End Bearings: Furnish end bearings. On multiple blade dampers, furnish oil-impregnated nylon or sintered bronze bearings. Furnish closed end bearings on ducts having pressure classification over 2 inches wg.

F. Quadrants:
1. Furnish locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on standoff mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches (750 mm) furnish regulator at both ends.
4. On dampers concealed above inaccessible ceiling, provide concealed damper regulators as manufactured by Young Regulator, Model 315, 927, 1200. In finished areas where appearance of instrument port is unacceptable, provide remote cable control as manufactured by Young Regulator, Model Bowden Cable Control.

G. Velocity and pressure rating of damper to match duct system characteristics at installed location.

2.5 FLEXIBLE DUCT CONNECTIONS

A. Manufacturers:
1. Durodyne Model Excelon for indoor application, Durolon for outdoor application.
2. Vent Fab.

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3. Elgen.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.

C. Connector, indoors: Fabric crimped into metal edging strip.
1. Fabric: UL listed fire-retardant silicon rubber coated woven glass fiber fabric conforming to NFPA 90A, minimum density 22 oz per sq yd.
2. Net Fabric Width: Approximately 3 inches wide.
3. Metal: 3-inch wide, 24-gage. Provide G-90 galvanized steel construction when connecting to galvanized ductwork and 316 stainless steel construction when connecting to stainless steel ductwork.

2.6 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent Test Holes: Factory fabricated, airtight flanged fittings with screw cap. Furnish extended neck fittings to clear insulation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 31 13 - Ducts for duct construction and pressure class.

B. Install back-draft dampers on exhaust fans or exhaust ducts nearest to outside and were indicated on Drawings.

C. Install duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and as indicated on Drawings. Install at locations for cleaning kitchen exhaust ductwork in accordance with NFPA 96. Install minimum 12 x 12 inch size for hand access, 24 x 24 inch size for shoulder access, and as indicated on Drawings. Review locations prior to fabrication.

D. Provide fire dampers at locations as indicated on Drawings. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings, and hinges.

E. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment and supported by vibration isolators.

F. Install balancing dampers a minimum of two (2) equivalent duct diameters from duct takeoff.

G. Shop fabricated dampers of any kind are not acceptable.

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H. Provide access doors at all smoke, fire, motorized, manual volume dampers, and duct mounted electric heaters.

3.2 DEMONSTRATION AND TRAINING

A. Demonstrate re-setting of fire dampers to Owner's representative.

END OF SECTION 23 33 01

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SECTION 23 34 23 - FANS

PART 1 - GENERAL

1.1 SCOPE

A. This Section provides for the furnishing and installation of fans with all supplemental equipment.

1.2 APPLICABLE PROVISIONS

A. Refer to Section 23 05 00 – Mechanical General Conditions.

1.3 PERFORMANCE

A. Provide fan type, arrangement, rotation, capacity, size, motor horsepower, and motor voltage as shown. Fan capacities and characteristics are scheduled on the Drawings.

B. Rate fans according to appropriate Air Moving and Conditioning Association, Inc. (AMCA), approved test codes and procedures. Supply fans with sound ratings below the maximums permitted by AMCA standards. All fans provided must be licensed to bear the Certified Ratings Seal.

C. Statically and dynamically balance all fans.

1.4 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Submit product data on all fans, including cut sheets, fan curve, sound data, performance data, and accessories provided.

C. On products required to have a paint finish, submit a detailed cut sheet of paint properties.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Centrifugal & Propeller Fans:
   1. Loren Cook (Basis of Design).
   2. Greenheck.
   3. Acme.
   4. ILG.

B. Vane Axial Fans:
   1. Loren Cook.
   2. Greenheck.
   3. Acme.
   4. ILG.

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2.2 SUPPLEMENTAL EQUIPMENT

A. Motor Covers: Furnish weatherproof motor covers for installation outdoors in inclement weather. Apply the same finish as used on the fan.

B. Safety Disconnect Switch: Furnish a factory-wired, safety disconnect switch on each unit.

C. Prefabricated Roof Curbs:
1. Furnish prefabricated roof curbs with built in cant strips and lined with R-8 glass fiber insulation. Curbs shall be made of minimum No. 18 U.S. Standard gage galvanized steel. The minimum height is 12 inches. Include on each roof curb a resilient pad for equipment mounting on the top flange. Curb base shall be flanged as needed to secure to roof structure. Base shall be flat or sloped as needed to match roof slope. Coordinate sloping requirements with General Contractor before ordering. Curb may be shim in the field as needed for level installation.
2. Roof curbs shall be constructed to support and secure fans in accordance with local windstorm code requirements. Manufacturer shall provide details for securing curb to building roof structure and unit to curb in accordance with local windstorm code requirements sealed by Texas State License Structural Engineer.
3. Provide curbs with integral damper tray for back draft damper installation and electrical conduit raceways.

2.3 CEILING MOUNTED CABINET EXHAUST FAN: COOK GC, DIRECT DRIVEN

A. Fan shall be ceiling mounted, direct driven, centrifugal exhaust fan.

B. Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories, Inc. (UL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.

C. The fan wheel housing and integral outlet duct shall be either injection molded from a specially engineered resin (exceeding UL requirements for smoke and heat generation) or minimum 20 gauge galvanized steel. Entire fan housing shall be provided with a ½" acoustical insulation liner. The outlet duct shall have provision for an aluminum backdraft damper with continuous aluminum hinge rod. The inlet box shall be minimum 22 gauge galvanized steel. Motor shall be isolation mounted to a one piece galvanized stamped steel integral motor mount/inlet. A field wiring compartment with receptacle shall be standard. To accommodate different ceiling thickness, an adjustable pre-punched mounting bracket shall be provided. Unit shall be designed with provision for field conversion from ceiling to in-line type installation.

D. Wheel shall be centrifugal forward curved type, either injection molded of polypropylene resin or galvanized steel. Wheel shall be balanced in accordance with AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.

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E. Motor shall be TEFC Electronically Commutated “EC” type with permanently lubricated sealed bearings and include impedance or thermal overload protection and disconnect plug. Motor shall be furnished at the specified voltage and phase. Provide motor with speed controller with access to adjust the speed while the fan is in operation through remote mounted dial or dial access cover on the side of the unit.

F. Provide single point power connection per NEC.

G. Accessories:
1. Ceiling Grille: High Impact White Plastic.
2. Unit mounted fan speed controller.
3. Wall cap (for through-the-wall installations).
4. Hanger support brackets.

2.4 ROOFTOP CENTRIFUGAL FANS: COOK ACE, DIRECT DRIVEN

A. Fan shall be a spun aluminum, roof mounted, direct driven, down-blast centrifugal exhaust ventilator.

B. Fan shall be manufactured at an ISO 9001 certified facility. Fan shall be listed by Underwriters Laboratories, Inc. (UL 705). Fan shall bear the AMCA certified ratings seal for sound and air performance.

C. The fan shall be of bolted and welded construction utilizing corrosion resistant fasteners. The spun aluminum structural components shall be constructed of minimum 16-gauge marine alloy aluminum, bolted to a rigid aluminum support structure. The aluminum base shall have continuously welded curb cap corners for maximum leak protection. The discharge baffle shall have a rolled bead for added strength. Provide two piece top cap with stainless steel quick release latches to provide access into the motor compartment without the use of tools. An integral conduit chase shall be provided through the curb cap and into the motor compartment to facilitate wiring connections. The motor shall be enclosed in a weather-tight compartment, separated from the exhaust airstream with direct drive configuration. Unit shall bear an engraved aluminum nameplate that includes model no., serial no., design air flow in CFM, and design static pressure.

D. Wheel shall be centrifugal backward inclined, constructed of 100% aluminum, including a precision-machined cast aluminum hub. Wheel inlet shall overlap an aerodynamic aluminum inlet cone to provide maximum performance and efficiency. Wheel shall be balanced in accordance with AMCA Standard 204-05, Balance Quality and Vibration Levels for Fans.

E. Motor Model ACED-EC: Motor shall be electronically commutated permanent magnet type rated for continuous duty and furnished with internally mounted speed controller. Unit shall be capable for remote control through 0-10 vdc signal or local manual adjustment for all 2-speed fans. Motor shall be provided to operate at electrical power listed on equipment schedules.

F. Windstorm Construction: Fan and curb assembly shall be listed and accepted by both Miami-Dade County, Florida and the Texas Department of Insurance TDI.
1. Florida NOA Number 08-0424.03/10-2-2013.

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2. TAS-201: Large Missile Impact Test.
3. TAS-202: Uniform Static Air Pressure Test.
4. TAS-203: Cyclic Wind Pressure Test.

G. Provide single point power connection per NEC.

H. Accessories: Provide the following accessories as indicated on the schedule:
1. All Aluminum Construction.
2. Stainless Steel Hardware.
3. Stainless Steel Bird Screen.
4. Integral electrical disconnect switch.
5. Epoxy phenolic coating on the entire fan assembly or equal.
6. 12” Insulated Roof Curb.
7. Stainless Steel Backdraft Damper, Ruskin Model S2SS or equal.
8. EC Motor speed controller – Two Speed Fans: Refer to equipment schedules.
a. Dual Speed: Vari-Flow VF2SC.
1) Mode Selector: Hand, Off, Auto-Select.
2) Local hand speed control dial.
3) Remote speed control from BAS; 0-10 vdc (Automatic Mode).
4) Remote on/off through binary contact closure.

PART 3- EXECUTION

3.1 EXECUTION

A. Install fans according to the manufacturer’s instructions and in the locations shown on the Drawings.

B. Provide flexible connection at inlet and outlet for fans.

C. Roof mounted fans shall be installed on roof curbs provided by the fan manufacturer.

D. Propeller wall fans shall be mounted in collars provided by the fan manufacturer. Carefully coordinate exact collar dimensions.

E. Roof mounted fans shall be installed on roof curbs provided by the fan manufacturer in accordance with TDI windstorm code requirements.

F. On roof mounted fans, electrical wiring and/or conduit shall not interfere with backdraft damper.

END OF SECTION 23 34 23

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SECTION 23 37 13 - AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Registers/Grilles.

B. Louvers.

1.2 RELATED SECTIONS

A. Section 23 31 130 – Ducts.

B. Section 23 33 01 - Duct Accessories.

C. Section 23 05 93 – Testing, Adjusting, and Balancing.

D. All Divisions of Contract Documents.

1.3 REFERENCES

A. ADC 1062 - Certification, Rating and Test Manual.

B. AMCA 500 - Test Method for Louvers, Dampers, and Shutters.

C. ARI 650 - Air Outlets and Inlets.

D. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.

E. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

F. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

1.4 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.5 PROJECT RECORD DOCUMENTS

A. Section 23 05 05 – Submittal Procedures.

B. Record actual locations of air outlets and inlets.

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1.6 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.

B. Test and rate louver performance in accordance with AMCA 500.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.

1.8 MANUFACTURERS

A. Basis of Design: Titus and Price.

B. Other acceptable manufacturers offering equivalent products:
1. Metalaire.
2. Krueger.

PART 2 - PRODUCTS

2.1 WALL SUPPLY REGISTERS/GRILLES

A. Manufacturers: Titus Model 272 RS/FS or as indicated on Drawings.

B. Type: Solid core, contoured airfoil, individually adjustable blades, 3/4 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing with spring or other device to set blades, vertical face, double deflection.

C. Frame: 1-1/4 inch margin with concealed mounting and gasket.

D. Fabrication: Aluminum frames and extruded aluminum blades with factory off-white enamel or as indicated on Drawings.

E. Damper: HVAC contactor shall install with remote duct mounted balancing dampers.

2.2 EXHAUST GRILLES

A. Manufacturers: Titus Model 3 FL or FS or as shown on Plans.

B. Type: 45 degree blades, 1 1/8 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing.

C. Frame: 1-1/4 inch margin with concealed mounting.

D. Fabrication: Extruded aluminum frames and blades with factory off-white enamel finish or as shown on drawings.

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E. Damper: No Damper

2.3 HEAVY DUTY BAR GRILLES

A. Manufacturers: Titus Model 33RL/S-SS or as shown on Plans.

B. Frame: 1-1/4 inch margin with exposed screw mounts.

C. Fabrication: Heavy duty 316 stainless steel with 20 gage (0.90 mm) minimum frames and 20 gage (0.90 mm) minimum blades with brushed finish.

D. Damper: No Damper.

2.4 EXTREME PERFORMANCE WALL LOUVERS

A. Manufacturers:
   1. Ruskin Model EME3625MD or as shown on Plans.
   2. Other acceptable manufacturers offering equivalent products:
      a. Greenheck.

B. Type: Single frame 3” deep.

C. Fabrication:
   1. Frame: 6063T6 extruded aluminum with 0.080-inch thick wall thickness, welded assembly construction.
   2. Blades: 0.050-inch thick extruded aluminum with anodized finish.

D. Mounting:
   1. Furnish with standard in-wall type mounting assembly. Louver shall be provided with installation details to secure louver to metal frame wall per TDI windstorm code requirements.
   2. Manufacturer shall provide installation details sealed by a licensed Texas or Florida Engineer.

E. Louver shall be tested and listed as follows:
   1. AMCA 550 Air Performance and Water Penetration.
   2. AMCA 540 Impact Test.
   3. Published performance per AMCA 500-L.
   4. Miami-Dade NOA No. 20-1201.01
   5. TDI Listed.
   6. Manufacturer shall provide details for securing louver to building wall structure in accordance with local windstorm code requirements sealed by Texas State License Structural Engineer.

F. Features and Accessories:
   1. Stainless wall sleeve.
   2. Finish Type: Anodized aluminum.

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G. Size: Louver shall be custom fabricated. Refer to Louver schedule.

H. Installation: Contractor shall install louver mounted to the wall in accordance with the windstorm installation instructions and as directed by the structural engineer on the project. Contractor shall install louver with wall sleeve and follow all of the installation details provided by the Architect.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate work of this Section with other affected work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install all outdoor equipment in accordance with TDI approved installation instruction as supplemented and approved by Windstorm Engineer provided on the project.

C. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

D. Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of the diffuser or grille and register assembly.

E. Visibility:
1. Paint ductwork visible behind air outlets and inlets matte black.
2. Rotate all return and exhaust air devices so that the curve of the blades is facing the eye of the occupant to prohibit visibility through the air device wherever possible.

END OF SECTION 23 37 13

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SECTION 23 40 00 - AIR CLEANING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Disposable, extended area panel filters.

1.2 REFERENCES

A. ARI 850 - Commercial and Industrial Air Filter Equipment.

B. ASHRAE 52.2 - Method of Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter.

C. UL 900 - Test Performance of Air Filter Units.

1.3 PERFORMANCE TOLERANCES

A. Conform to ASHRAE 52.2

1.4 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

1.5 OPERATION AND MAINTENANCE DATA

A. Section 23 05 05 – Submittal Procedures.

B. Operation and Maintenance Data: Include instructions for operation, changing, and periodic cleaning.

1.6 EXTRA MATERIALS

A. Provide MERV-8 disposable panel filters during construction. Periodically inspect temporary construction filters and change out when dirty or as directed by manufacturer’s recommendations whichever comes first. If, in the opinion of the Owner’s representative, the temporary construction filters require changing, then the filters shall be changed out with clean filters at no additional cost to the Owner. Provide one (1) clean set of MERV-9A for air balance, and one (1) spare set of MERV-9A to Owner at project completion. Clean coils free of dirt and debris at the end of construction. Complete cleaning before commissioning of equipment.

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PART 2 - PRODUCTS

2.1 DISPOSABLE, EXTENDED AREA PANEL FILTERS – MERV-9

A. Manufacturers:
1. Camfil-Farr Model 30/30 Dual 9
2. American Air Filter, Model MEGApleat M9
3. Precisionaire/Flanders.

B. Media: UL 900 Class 2, pleated, minimum 14 pleats per lineal foot, lofted, non-woven, reinforced cotton and synthetic fabric; supported and bonded to welded wire grid or moisture resistant beverage carrier board.
1. Frame: Moisture resistant beverage carrier board.
2. Nominal thickness: 4 inches: Initial pressure loss (500 FPM): 0.17 inches W.G.

C. Rating, ASHRAE 52.2: MERV 9A.

PART 3- EXECUTION

3.1 PREPARATION

A. Coordinate work of this Section with other affected work.

3.2 INSTALLATION

A. Install air-cleaning devices in accordance with manufacturer's instructions.

B. Prevent passage of unfiltered air around filters with felt, rubber, or neoprene gaskets.

C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing with clean set.

D. Protect all return air ductwork during construction with temporary air filters installed over each return air inlet. The Contractor shall inspect air filters daily and replace as needed depending on particulate load.

END OF SECTION 23 40 00

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SECTION 23 62 13 - AIR COOLED CONDENSING UNITS – 5-TONS AND UNDER

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Condensing unit package.

B. Charge of refrigerant and oil.

C. Controls and control connections.

D. Refrigerant piping connections.

E. Motor starters.

F. Electrical power connections.

1.2 REFERENCES

A. ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment.

B. ARI 270 - Sound Rating of Outdoor Unitary Equipment.

C. ARI 365 - Commercial and Industrial Unitary Air-Conditioning Condensing Units.

D. ASHRAE 14 - Methods of Testing for Rating Positive Displacement Condensing Units.

E. ASHRAE 15 - Safety Code for Mechanical Refrigeration.

F. ASHRAE 90A - Energy Conservation in New Building Design.

G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

H. NEMA MG 1 - Motors and Generators.

I. UL 207 - Refrigerant-Containing Components and Accessories, Non-Electrical.

J. UL 303 - Refrigeration and Air-Conditioning Condensing, and Air-Source Heat Pump Equipment.

1.3 SUBMITTALS FOR REVIEW

A. Section 23 05 05 – Submittal Procedures.

B. Shop Drawings: Indicate components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections. Include schematic layouts

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showing condensing units, cooling coils, refrigerant piping, and accessories required for complete system.

C. Product Data: Provide rated capacities, weight specialties and accessories, electrical nameplate data, and wiring diagrams. Submit combined capacity with evaporator coils to ensure capacities are complementary.

D. Coordination Data: Provide electrical division with a drawing showing power and control knockout locations and equipment pad layout. Indicate orientation of equipment for coordination of electrical conduit routing.

1.4 SUBMITTALS FOR INFORMATION

A. Section 23 05 05 – Submittal Procedures.

B. Design Data: Indicate pipe and equipment sizing.

C. Submit manufacturer's installation instructions.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 23 05 05 – Submittal Procedures.

B. Operation and Maintenance Data:
1. Include start-up instructions, maintenance instructions, parts lists, controls, warranties and accessories.
2. Manufacturer also shall provide full-service repair manuals for each model of equipment provided on project. Manuals shall provide thorough repair and diagnostics information for all system components such as digital controls, digital fans, electronic expansion valves, and the like. Provide a minimum of two (2) paper copies.

1.6 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Transport, handle, store, and protect products.

B. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

C. Protect units on site from physical damage. Protect coils.

1.8 WARRANTY

A. Provide one (1) year parts and labor warranty on complete unit.

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B. Provide an additional four (4) year compressor parts warranty for a total of five (5) year compressor warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers:
1. Lennox
2. Carrier
3. Trane
4. American Standard

B. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, starters, and controls.

C. Refrigerant:
1. R-454B.
2. Provide with all required semi-flammable refrigerant labels.

D. Construction and Ratings: In accordance with ARI 210/240 ARI 365, UL 207 and UL 303. Testing shall be in accordance with ASHRAE 14.

E. Performance Ratings: Energy Efficiency Rating (EER) not less than prescribed by ASHRAE 90.1 but equivalent to scheduled equipment.

2.2 CASING

A. House components in steel or molded plastic frame with steel panels with weather resistant, baked enamel finish.

B. Mount starters and controls in weatherproof panel provided with full opening access doors.

C. Provide removable access doors or panels with quick fasteners.

2.3 CONDENSER COILS

A. Coils: Aluminum fins mechanically bonded to seamless aluminum tubing or all aluminum construction; spin fins or micro-channel. Provide sub-cooling circuits. Air test under water to 600 psig and vacuum dehydrate. Seal with holding charge of nitrogen or refrigerant.

B. Coil Guard: Provide PVC coated or painted steel hail guards.

2.4 FANS AND MOTORS

A. Vertical discharge direct driven propeller type condenser fan with fan guard on discharge.

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B. Weatherproof motor suitable for outdoor use, single phase constant or variable speed motor with permanent lubricated ball bearings and built-in current and thermal overload protection.

C. Provide acoustical fan discharge hood for low sound operation where available.

2.5 COMPRESSORS

A. Compressor: Hermetic scroll type.

B. Mounting: Statically and dynamically balance rotating parts. Mount compressors on rubber-in-shear vibration isolators.

C. Motor –Scroll Compressor:
1. Constant speed 3500-rpm suction gas cooled with winding over-temperature and over current protection, designed for across-the-line starting. Furnish with starter. VFDs are not allowed.
2. Provide two stage mechanical solenoid control unloading scroll compressor with all associated controls; 67%-100% capacity control.

D. Sump Oil Heater: Evaporates refrigerant returning to sump during shut down. Energize heater thermostatically when compressor is not operating.

E. Sound: Each compressor shall be provided with low sound enclosures when available.

2.6 REFRIGERANT CIRCUIT

A. Provide each unit with the number of independent refrigerant circuits as indicated on plans, factory supplied and piped.

B. For each refrigerant circuit, provide:
1. Filter dryer permanent core type.
2. Liquid line sight glass and moisture indicator.
3. Hard Shutoff thermal expansion valve for maximum operating pressure.
4. Insulated suction piping.
5. Suction and liquid line service valves and gage ports, reverse thread for semi-flammable refrigerant.
6. Condenser pressure relief valve.

2.7 CONTROLS

A. Mount weatherproof control panel containing power and control wiring in unit, factory wired with single point power connection.

B. For compressor, provide across-the-line starter, starter relay, and control power transformer or terminal for controls power. Provide automatic reset current overload protection. 2-stage cooling controller.

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C. Provide safety controls arranged so any one will shut down machine:
   1. High discharge pressure and low suction pressure switch with automatic reset.
   2. Compressor over current protection.

D. Provide the following operating controls:
   1. Adjustable off timer prevents compressor from short cycling.
   2. Low ambient temperature controls to permit cooling operation down to 30 degrees F ambient temperature through variable fan speed operation.

2.8 WINDSTORM RESTRAINTS

A. Ground Mounted: Provide with manufacturer’s Extreme Condition Mounting kits to secure ACCU to concrete pads in accordance with TDI windstorm design requirements for project location.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate work of this Section with other affected work.

3.2 INSTALLATION

A. Install in accordance with manufacturer's installation instructions.

B. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions. Provide control wiring and conduit.

C. Provide for connection to electrical service.

D. Install units on vibration isolation.

E. Install units on supports as indicated on drawings.

F. Provide connection to refrigeration piping system and evaporators. Comply with ASHRAE 15.

G. Refrigerant pipe sizes shall be selected according to equipment manufacturer's instructions. Sizes shown on plans are for bidding purposes only. Manufacturer's selection may deviate from Plans.

H. Provide refrigerant liquid pipe filter/drier upstream of each TXV refrigerant meeting device.

I. Furnish charge of refrigerant and oil.

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3.3 DEMONSTRATION AND INSTRUCTIONS

A. Section 23 05 10 – Starting of HVAC Systems: Demonstrating installed work.

B. Supply initial charge of refrigerant and oil for each refrigeration system. Replace losses of oil or refrigerant prior to end of correction period.

C. Test entire system for leaks before charging with refrigerant and installation of any piping insulation. Repair leaks if found, put system into operation, and test equipment performance.

D. Charge system with refrigerant by method recommended by equipment manufacturer. Engineer recommends sub-cooling temperature method as follows:
   1. Record all cooling and heating performance at full load conditions.
   2. Wait minimum 20-minutes of operation before adjusting refrigerant charge as needed to achieve desired sub-cooling temperature.
   3. Adjust system charge in cooling when ambient temperature is above 60 °F.
   4. Adjust system charge when indoor AHU temperature is between 70-80 °F.

E. Contractor shall provide proposed OEM or internal start-up sheets for review and consideration by Engineer prior to system startup in a submittal format. Contractor shall make any changes to the forms and the startup procedures as recommended by the Engineer.

F. Provide cooling season startup and winter season shut-down for first year of operation.

END OF SECTION 23 62 13

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SECTION 23 81 13 - THROUGH WALL PACKAGED TERMINAL UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes packaged terminal unit.

1.2 RELATED SECTIONS

A. Comply with Division 1 - General Requirements and referenced documents.

B. Comply with all other Division 23 Sections as applicable. Refer to other Divisions for coordination of work with other trades as required.

1.3 SYSTEM DESCRIPTION

A. The scope shall include packaged terminal air conditioning units, supports, and all appurtenances.

1.4 QUALITY ASSURANCE

A. All equipment and materials shall be new and of the best quality.

B. All equipment and materials shall be installed in a workmanlike manner by experienced mechanics and as recommended by the manufacturer.

C. All equipment shall be certified in accordance with UL Standard 1995/CSA C22.2 No. 236, Safety Standard for Heating and Cooling Equipment.

D. Refrigeration system shall comply with ASHRAE Standard 15, Safety Standard for Mechanical Refrigeration.

E. Safety Standards:
1. Underwriters Laboratories (UL).
2. National Electric Code (NEC).
3. Canadian Electric Code (CEC).

F. Air-Conditioning, Heating and Refrigeration Institute (AHRI): AHRI 310/380 Packaged Terminal Air-Conditioners and Heat Pump Equipment.

G. All models shall be ASHRAE 90. 1-2015 compliant and must meet the minimum requirements of the 2015 International Energy Conservation Code.

H. ISO 9001, Manufacturing Quality Systems.

1.5 SUBMITTALS

A. Refer to Section 23 05 05 Submittals for additional Submittal requirements.

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B. Product Data: Submit manufacturer's descriptive literature and installation instructions. Submit fan curves for all fans.

C. Indicate:
1. Equipment performance at scheduled and specified operating conditions.
2. Equipment, piping and connections, together with control assemblies, thermostatic controls, auxiliaries and hardware and recommended ancillaries which are mounted, wired and piped ready for final connection to building system.
3. Fittings shipped loose showing final location in assembly.
4. Control equipment shipped loose, showing final location in assembly.
5. Dimensions, internal and external construction details, recommended method of installation with proposed structural steel support, mounting sleeve details, sizes and location of mounting bolt holes; include mass distribution drawings showing point loads.
6. Detailed composite wiring diagrams for control systems showing factory installed wiring and equipment on packaged equipment or required for controlling devices or ancillaries, accessories and controllers.
7. Details of vibration isolation.
8. Estimate of sound levels to be expected across individual octave bands in db.
9. Type of refrigerant used.
10. Plan view, front view end view, back view and curb detail with dimensions.

D. Quality Assurance:
1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
3. Manufacturer’s Instructions: Manufacturer’s installation instructions.

1.6 PRODUCT HANDLING

A. Cover and protect material in transit and at site. Material not properly protected and stored and which is damaged or defaced during construction shall and will be rejected.

B. Storage and protection of materials shall be in accordance with Section 23 05 00 – Mechanical General Conditions.

PART 2 - PRODUCTS

2.1 PTAC UNITS

A. Acceptable Manufacturers:
1. Basis of Design – Islandaire EZ Series 42 and DR (Dr. PTAC).
2. Amana.
3. GE.
4. Fredrich.

B. Warranty: One (1) year parts and labor warranty for the completed unit with Five (5) year parts only warranty for the sealed systems components.

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C. Heating/Cooling Chassis:
1. Chassis shall be slide-in, plug-in type with a self-contained, hermetically sealed refrigerant circuit. All chassis sheet metal parts shall be constructed of either A-60 with a powder coated, baked on urethane powder paint, or G-60 galvanized steel for maximum corrosion resistance.
2. Compressor shall be vibration isolated, permanent split capacitor rotary-type compressor; rifled copper tube evaporator and condenser coils with high efficiency raised lance E-coated aluminum plate fins mechanically expanded to the tubes for maximum heat transfer; and a capillary restrictor type refrigerant metering device.
3. Model DR Only:
   a. Unit shall include a humidistat and separate internal dehumidifier compressor to provide preconditioned makeup air into space.
   b. System airflow shall be accomplished by the use of separate outdoor/condenser and indoor/evaporator fan motors.
4. Motors shall be multi-speed permanent split capacitor or ECM, totally enclosed and permanently lubricated.
5. The outdoor/condenser fan shall be dynamically balanced, corrosion resistant polymer multi-blade axial flow design, with integral slinger ring.
6. The indoor/evaporator fan assembly shall consist of one permanent split-capacitor, direct-drive permanently lubricated, multi-speed fan motor. The fan shall be a dynamically balanced, polymer, reverse curve blower wheel.
7. All fans shall be statically and dynamically balanced to provide for quiet and smooth operation.
8. Heater shall be factory-installed, open coil type, electric and contain automatic reset and manual over temperature protection.
9. Provide condensate drain kit for external pipe connection to be installed with the wall sleeve.

D. System Operation – Model EZDR:
1. During the cooling cycle, both compressors and both the outdoor/condenser and indoor/evaporator fan motors shall be energized. Condensation accumulated on the indoor/evaporator coil shall be drained into the outdoor section of the unit where it is to be picked up by the outdoor/condenser fan and transferred to the outdoor/condenser coil where it shall then be evaporated. In Cool Mode, the compressor will cut in if the space temperature is more than 1°F higher than the thermostat set point and cut out if the space temperature is less than 2°F lower than thermostat set point. Dehumidification compressors shall condition make-up air continuously during Occupied Mode as needed based on outdoor humidity.
2. During the heating cycle with Electric Resistance Heat, only the indoor/evaporator fan motor and electric resistance heaters are energized. The outdoor/condenser fan motor and compressor shall not be energized. Heaters shall be open wire type with quick response and high limit cutout. Electric resistance heaters must be placed behind the indoor/evaporator coil and must not be visible or accessible through the indoor discharge grill. When the heater cuts out the indoor fan continues to run for minimum 15 seconds at the set speed, regardless of On or Off mode. After 15 seconds the fan will stop running if the unit is in the Off mode, otherwise the fan operation will depend on Fan Continuous or Cycle setting.

E. System Operation – Model EZ42:
1. During the cooling cycle, compressor and the outdoor/condenser and indoor/evaporator fan motors shall be energized. Condensation accumulated on

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the indoor/evaporator coil shall be drained into the outdoor section of the unit where it is to be picked up by the outdoor/condenser fan and transferred to the outdoor/condenser coil where it shall then be evaporated. In Cool Mode, the compressor will cut in if the space temperature is more than 1°F higher than the thermostat set point and cut out if the space temperature is less than 2°F lower than thermostat set point.

2. During the heating cycle with Electric Resistance Heat, only the indoor/evaporator fan motor and electric resistance heaters are energized. The outdoor/condenser fan motor and compressor shall not be energized. Heaters shall be open wire type with quick response and high limit cutout. Electric resistance heaters must be placed behind the indoor/evaporator coil and must not be visible or accessible through the indoor discharge grill. When the heater cuts out the indoor fan continues to run for minimum 15 seconds at the set speed, regardless of On or Off mode. After 15 seconds the fan will stop running if the unit is in the Off mode, otherwise the fan operation will depend on Fan Continuous or Cycle setting.

F. Controls - Remote Thermostat:
   1. Provide Verdant Environmental Technologies Model VX-TR-KT-W (Wired) thermostat or equal with conventional binary control wiring interface.
   2. Features:
      a. Digital display
      b. Built in IR occupancy motion sensor.
      c. Temperature Setback: Automatically adjusts setback temperatures based on occupancy status through IR sensor.
      d. Temperature Limits: Admin settings.
         1) Setback Limits: Unoccupied Heating and Cooling
         2) Set Point Limits: Thermostat will allow the occupant to adjust space temperature in heat or cooling to the maximum limits set in the thermostat through administrative privileges.
      e. Fan Speed Adjust: High/Low
      f. Single Stage Cooling and Two Stage Heating: If 2-stage heating is not available, the HVAC contractor shall be provided with a 10-minute delay on make timer block (ICM102 or equal) on stage 2 heater.

G. Wall Sleeve:
   1. The wall sleeve shall be entirely constructed of A-90 galvannealed, phosphatized, 18-gauge steel. It shall be finished with a baked on, urethane-based powder paint, which is to provide maximum corrosion protection. Additionally, the top interior and side interior surfaces shall be insulated. Wall sleeves shall have factory provisions for use of appropriate fastening devices to secure sleeve to the wall through the sides. Fasteners shall not be installed through the base pan in the bottom of the wall sleeve. Provide subbase to support wall sleeve as required.
   2. Provide with Extreme SeaCoast protective paint coating.
   3. Provide with external drain kit.
   4. Provide with removable aluminum wall louver, flush mount to wall.

H. Room Cabinet:
   1. Each heating/cooling chassis shall come complete with a room cabinet.
   2. The room cabinet shall be designed with a sloped top to facilitate airflow into the room.

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3. The room cabinet shall be designed to wrap-around the heating/cooling chassis and the color of the room cabinet shall be such as to match that of the wall sleeve. Room cabinet side panels shall be constructed of polycarbonate material with decorative vertical grooves and flame class rated at 94V0 per UL standard 494.
4. The airflow discharge grille shall be an integral part of the room cabinet and shall be made of the same polycarbonate material as the room cabinet side panels. The discharge grille shall consist of four sections and designed to be two-position reversible to customize the direction of airflow out of the unit.
5. Additionally, the grille shall be tamperproof, and carry a flame test rating of 94V0 in accordance with UL standard 494.

I. Protection: Compressors shall have automatic reset, over temperature and over current protection. The fan motors shall have automatic rest over temperature protection. Heater shall have two over temperature protectors.

J. Filtration – Standard: Room side return air shall be completely filtered through a permanent, washable polypropylene mesh filter. Foam type filters are not acceptable. Filter must be a UL listed class II, 38% average efficiency (ASHRAE test) air filter with low resistance to airflow (0.02 w.g. at 300 CFM) and high dust holding capacity of 55 grams.

K. Outside Louver: Outside louver shall be extruded architectural anodized aluminum. Coordinate color with HVAC Contractor and General Contractor prior to ordering.

L. Electrical:
1. Provide with single point power connection with voltage and phase as scheduled.
2. Provide with power cord and end cap to match the scheduled power conditions.

M. Accessories:
1. Provide SeaCoast extreme paint finish for the wall steel and the entire chassis and internal components.
2. External Condensate Drain Kit
3. Flexible Power Cord with end cap
4. Wired Remote Thermostat
5. Dr. PTAC outside air dehumidifier. Refer to equipment schedules for locations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units in strict accordance with Manufacturer’s instructions.

B. Slope wall sleeve and provide condensate drain in accordance with Manufacturer’s instructions and route to nearest plumbing drain or as shown on plans.

C. Secure unit to meet all applicable local windstorm certification requirements.

D. Startup:
1. Test equipment operations at startup and complete manufacturers startup forms.
2. Coordinate activities with commissioning provider.

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E. Coordinate electrical requirements with Electrical Contractor.

END OF SECTION 23 81 13

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SECTION 23 82 19 - DX AIR HANDLING UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes air handling units and electric heaters.

1.2 REFERENCES

A. ARI 410 (Air-Conditioning and Refrigeration Institute) - Forced-Circulation Air-Cooling and Air-Heating Coils.

B. UL 1096 (ANSI/Underwriters Laboratories, Inc.) - Electric Central Air Heating Equipment.

1.3 SUBMITTALS

A. Section 23 05 05 – Submittal Procedures.

B. Product Data: Submit coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions. Submit mechanical and electrical service locations, capacities, and requirements.

C. Manufacturer’s Installation Instructions: Submit assembly, support details, and connection requirements.

D. Manufacturer’s Certificate: Certify products meet or exceed specified requirements.

E. Operation and Maintenance Data:
1. Include start-up instructions, maintenance instructions, parts lists, controls, warranties and accessories.
2. Manufacturer also shall provide full-service repair manuals for each model of equipment provided on project. Manuals shall provide thorough repair and diagnostics information for all system components such as digital controls, digital fans, electronic expansion valves, and the like. Provide a minimum of two (2) paper copies.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three (3) years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept units on site in factory packing. Inspect for damage. Store under roof.

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B. Protect coil fins from crushing and bending by leaving in shipping cases until installation, and by storing indoors. Protect coils from entry of dirt and debris with pipe caps or plugs.

1.6 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.7 WARRANTY

A. Provide one (1) year parts and labor warranty on complete unit.

PART 2 - PRODUCTS

2.1 AIR HANDLING UNITS

A. Manufacturers:
1. Lennox (Basis of Design).
2. Trane
3. Carrier
4. American Standard

B. Refrigerant:
1. R-454B.
2. Provide with all required semi-flammable refrigerant labels.
3. Provide with on board factory wired and commissioned UL 60335-2-40 semi flammable refrigerate detector control system; Refrigerant Detection System (RDS) sensor and Refrigerant Detection System (RDS) blower control board.
4. If the RDS detects refrigerant, the system will stop the compressor and/or heating operation and operate the supply fan to reduce the concentrations in the conditioned space. Once safe levels are reached the HVAC system will resume normal operation.

C. Fan coil units shall be completely factory assembled including fan, motor, evaporator coil, expansion valve, condensate drain pan, insulated casing, electric heater, filter rack, filters, and controls. Units shall be suitable for vertical or horizontal configuration. Units shall be UL listed for intended application.

D. Copper tube and aluminum fin or 100% all aluminum construction with Thermostatic Expansion Valve, removable plastic IAQ drain pan and slide out design.

E. Cabinet:
1. Heavy gauge galvanized steel construction with baked enamel finish. Cabinet shall be completely lined with minimum R-4.2 glass fiber insulation and adhered with adhesive and mechanical fasteners.
2. Access Doors: Provide easily removable insulated service access doors with mechanical fasteners

F. Finish: Factory applied baked enamel on visible surfaces of enclosure or cabinet.

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G. Fans: Provide direct driven fan with centrifugal forward-curved double-width wheels, statically and dynamically balanced. Provide high efficiency ECM motor with permanently lubricated ball bearings and rubber in shear vibration isolators. Provide with digital fan speed selector control suitable for multi-stage cooling and heating air volume. Provide on slide rail for easy removal and power disconnect plug.

H. Electrical Power and Control:
1. Single Point Power Connection: Single point power wiring connection, factory-wired, located in cabinet. Provide control terminal block for connection of thermostat and fan controls including fan contactor, control transformer, relay, or heat controls. Heat controls shall be configured for heat pump stage one heating and electric backup heating. Power and control wiring to be provided in accordance with National Electric Code.
2. Provide with integral circuit breaker type electrical disconnect switch wired for single point power connection as indicated on equipment schedules.
3. Provide with either digital or electro-mechanical controls for connection to matched outdoor condensing unit. All control inputs shall be through standard binary control inputs such as R, G, X, C, Y1, Y2, W1, W2 and the like.
4. Evaporator Freeze Protection:
   a. Each unit shall be provided with either electronic or thermostatic evaporator freeze protection controls.
   b. Recommended Setpoints: Cut Out @ 34° F and Cut In 45° F.

I. Filter: Provide with external extended area filter sub-base. Refer to equipment schedules.

J. Electric Resistance Heater:
1. Assembly: ANSI/UL 1096 listed and labeled, with terminal control box and cover, splice box, heavy duty nickel chromium elements, casing, and controls.
2. Controls: Automatic reset thermal cut-out, built-in magnetic contactors, control circuit transformer and fuse, manual reset thermal cut-out, air flow proving device, fusing per stage.
3. Staging: Refer to HVAC equipment schedules.
4. Heater shall be slip in type for installation within air handling unit cabinet.

K. Accessories:
1. Provide each unit with a secondary drain overflow float switch. Float shall be RECTORSEAL MODEL No. SS2 or approved equal. Wire switch to operate supply fan and disable compressor upon sensing water
2. Thermostat:
   a. Honeywell Model Vision Pro 8000.
   b. Touch screen digital programmable thermostat, minimum 2-stage heat and 2-stage cool with convention binary control outputs. 24-vac power that does not require batteries.
   c. Provide with remote mounted space temperature sensor.

PART 2 - EXECUTION

2.1 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

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B. Units with Cooling Coils: Install drain piping to condensate drain. Construct p-trap in accordance with Drawings and manufacturer's instructions.

C. Connect refrigerant piping to condensing unit in accordance with manufacturer's instructions.

D. Coordinate connection of electrical power with Electrical Division.

E. Install controls for operation of heating and cooling.

F. Install piping connection to units to maintain service and maintenance clearance to coils, motors, and filters and to provide access to other mechanical and electrical equipment within mechanical rooms.

G. Shim unit up as required for free air filter pull access.

END OF SECTION 23 82 19

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SECTION 26 00 00 - ELECTRICAL SPECIFICATIONS

1.1 GENERAL

A. Section 20 00 00 is a part of these Electrical Specifications for Stadium Improvements, Calallen Independent School District, Corpus Christi, Texas.

1.2 SCOPE

A. Work to be accomplished under these Specifications includes the furnishing of all labor, materials, and equipment required for the complete installation as described herein and as indicated on the Drawings.

B. Work is to be completed from point of service to each outlet indicated on Drawings and/or specified herein with all accessory construction as may be required to make the installation of each piece of equipment complete and ready for normal service. In general, this work consists of the following:

1. A system of power connections to the heating and air conditioning equipment as indicated on the Drawings.
2. A system of power connections and control provisions for the ventilation equipment as indicated on the Drawings.
3. A system of conduits, junction boxes, pull boxes, outlet boxes with plates, wiring devices, panelboards, disconnect switches, lighting fixtures, transformers, conductors, time clocks, and related items for the power and lighting system.
4. A partial system of conduits with Jetline pullcords, junction boxes, pull boxes, outlet boxes with plates, and related items for communication / IT data transmission system cabling, equipment and devices by separate contract.
5. A partial system of conduits with pullcords (extensions from existing conduit), pull box and related items for Owner provided scoreboard and 25 second play clock control.
6. A partial system of conduits, outlet boxes with plates, junction boxes, and a complete system of conductors, manual stations, control panel, signaling devices, detectors, and related items for a complete fire alarm system. This requirement shall apply to the electrical contractor if and only if the electrical contractor subcontracts the fire alarm portion of the project to the fire alarm subcontractor. If the general contractor subcontracts the fire alarm work directly, these requirements become the responsibility of the general contractor to coordinate.
7. A partial system of conduits with Jetline pullcords, outlet boxes with plates, junction boxes, and related items for BAS system cabling and devices by the BAS system contractor.
8. A partial system of conduits, junction boxes, outlet boxes with plates and a complete system of conductors, control devices, control/processing equipment for complete stand-alone lighting control systems.

C. Installation of this work, including all materials and labor shall be first class in every respect and in exact accordance with these Specifications and accompanying Drawings. It is intended that Specifications and accompanying Drawings shall include everything requisite and necessary for proper installation of electric wiring, even though every item may not be particularly mentioned in detail.

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1.3 ELECTRICAL SERVICE

A. The existing service utilization voltage is solidly grounded, 277/480 volt, 3-phase, 4-wire nominal.

B. Contractor shall furnish all new service equipment not furnished by power company for a complete installation.

C. Contractor shall furnish all new service equipment and materials as indicated on the Drawings and as required for electrical service extensions to new equipment.

1.4 TEMPORARY POWER AND LIGHTING

A. Contractor shall provide all necessary portable/temporary cables, service switches, ground fault protection, etc. required for temporary power and lighting during construction. Temporary construction power may be derived from the existing facility distribution system without cost of use charges.

1.5 GROUNDING

A. All new and modified electrical systems shall be grounded in accordance with Article 250 of the National Electrical Code, and as hereinafter specified.

B. Driven ground rods shall be provided where required and/or where indicated on the Drawings. Ground rods shall be minimum 3/4" x 10'-0" Copper-weld or equal. All ground wiring shall have adequate mechanical protection, and be exothermically welded to rods.

C. Grounding electrode and equipment conductors with a "green" colored insulated jacket shall be provided and installed in all raceways, whether non-metallic or metallic.

D. All new and modified equipment shall have an effective equipment ground in accordance with the National Electrical Code.

E. The main service entrance ground is existing. Contractor shall provide extensions from this existing ground as required for compliance with Article 250 of the National Electrical Code.

1.6 CONDUIT AND TUBING

A. Conduit size for interior applications shall be ½” unless otherwise indicated on the Drawings or otherwise specified. Conduit size for exterior / underground applications shall be ¾” unless otherwise indicated.

B. Conduit installed underground or in concrete slabs shall be Schedule 40 rigid polyvinyl chloride (PVC) conduit as manufactured by Allied or approved equal, installed in accordance with National Electrical Code, and as indicated on Drawings. All PVC conduit shall have Underwriters Laboratory, Inc. approval for direct burial underground without concrete encasement. All PVC conduit must be installed in accordance with

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manufacturer's recommendations and in strict accordance with the applicable sections of these Specifications.

C. Conduit installed above grade in damp or wet locations shall be rigid hot-dip galvanized or schedule 40 rigid aluminum conduit with screwed couplings and fittings. All fittings used shall be hot-dip galvanized for steel conduit or aluminum for aluminum conduit.

D. Fittings and connections involving dissimilar metals will not be allowed in damp or wet locations.

E. All conduit in furred ceiling spaces, interior masonry, or stud partitions and dry locations shall be galvanized thinwall (EMT) with die-cast watertight, insulated throat type compression fittings. Indentor type or set screw type connectors and fittings will not be accepted. All conduit installed in finished spaces shall be concealed unless otherwise specifically indicated on the Drawings.

F. MC type cable is not permissible for use except as specifically permitted by Paragraph 1.6.G.2 of these Specifications. Other types of cable shall not be utilized for any purpose.

G. Flexible metal conduit shall not be used for any purpose except as hereinafter specified and as specifically indicated on the Drawings. All flexible metal conduit shall be installed in strict accordance with Articles 348 and 350 of the National Electrical Code. Non-metallic flexible conduit will not be acceptable for any purpose.
   1. Connections to mechanical and plumbing equipment shall be made with flexible metal conduit. Length of flexible conduit for this application shall not exceed 6'-0".
   2. Flexible metal conduit or MC type cable may only be used above ceilings for light fixture connections. Length of flexible conduit for this application shall not exceed 6'-0".
   3. Liquid tight flexible metal conduit shall be used for connection to dry type transformers. Length of flexible conduit for this application shall not exceed 6'-0".
   4. Where flexible conduit is used for connections to equipment in damp or wet locations, conduit shall be liquid-tight flexible metal conduit with approved fittings.

1.7 INSTALLATION AND ROUTING OF CONDUITS

A. All conduit shall be run in the straightest possible path.

B. Not more than three (3) 90 degree bends will be permitted in any one (1) conduit run and no run shall be longer than allowed by the National Electrical Code without the installation of pull boxes. There shall not be any pull boxes or junction boxes installed in inaccessible space.

C. Exposed conduit shall be run in straight lines, at right angles to, or parallel with walls, beams, columns, or decks, and shall be supported at maximum of 6'-0" by approved conduit straps or suitable clamps on hangers to provide a rigid installation. PVC conduit shall not be run exposed for any application.

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D. In no case shall conduit be fastened to other pipe or equipment or so installed as to prevent the ready removal of other pipes or equipment for repairs.

E. All Schedule 40 steel and aluminum conduit ends are to have a minimum of five full threads. No threadless connectors are to be used. All conduit shall be reamed after cutting and threading and before installation; runs shall be straight and true; elbows, offsets, and bends shall be uniform and symmetrical. All conduit after installation and prior to completion of project shall be capped to prevent entrance of moisture and foreign objects. Conduit shall be swabbed before installation of wire. PVC conduit joints shall be made in accordance with manufacturer's recommendations.

F. Elbows in PVC conduit below grade shall be Schedule 80 PVC.

G. Provision shall be made for expansion and contraction of all conduit as hereinafter specified.

H. Underground PVC conduit shall not be extended above grade. PVC shall be transitioned to Schedule 40 rigid galvanized or aluminum conduit at level of finished grade or slab for all exterior applications and in damp or wet locations. PVC shall be transitioned to EMT at slab level for all interior applications in dry locations.

I. All underground conduits shall have a minimum cover from top of conduit to finished grade of at least 24".

J. Provide 4" wide yellow warning tape 1’-0” above all underground secondary and communication conduit exterior to building lines.

K. All steel and aluminum (vertical rise) conduits and fittings in damp and wet locations shall be wrapped with 3M pipe wrap. Successive winds of pipe wrap shall be overlapped at least 1". Vertical rise conduit shall be wrapped to at least 6" above finished grade or slab.

L. All conduit which is stubbed and capped below grade for future services shall be terminated with PVC T/A and female threaded rigid galvanized steel cap so that stub may be located in the future with a metal detector.

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1.8 CONDUIT AND FITTING SUBMITTAL

A. The Contractor shall complete the following table and submit for approval prior to acquisition of conduit and conduit fittings.

B. A copy of the following table (submitted and approved) shall be retained on site in the possession of the on-site electrical foreman until the certificate of substantial completion is executed.

CONDUIT AND FITTING TABLE							
Location / Environment	Conduit Type and Schedule	Coupling Material and Type	Terminal Adapter Material/Type	Elbow Material / Type	Expansion Fitting Material	Condulet Material	Maximum Allowance Length
Interior/Dry Locations							NA
Under Cover/Damp Locations							NA
Exterior/Wet Locations							NA
Below Grade							NA
Flexible Conduit Dry Locations		NA		NA	NA	NA	
Flexible Conduit Damp and Wet Locations		NA		NA	NA	NA	
Cable – Refer to 1.6.G.2		NA		NA	NA	NA	

SUBMITTED BY CONTRACTOR_____ DATE:_____

ENGINEER APPROVAL:_____ DATE:_____

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1.9 EXPANSION JOINTS

A. Provision for expansion and shifting of conduits shall be provided where conduit rises from underground or crosses a building expansion joint.

B. Conduits which are freely suspended in space and crossing a building expansion joint shall be considered as having sufficient freedom for any expansion or movement on interior of building.

C. Steel and aluminum conduit connected to conduit which rises from below grade and terminating in a panelboard, cabinet, switch, or other fixed device shall have expansion fitting installed above grade.

D. All underground conduit which rises up through the floor slab shall pass through a pipe sleeve in the floor to allow any movement between the underground conduit and structural members of the building.

1.10 CONCRETE

A. All concrete footings shall be readymix type transit mix and shall be continuously agitated until poured. Concrete shall be minimum 2,500 pound strength after 30 days.

1.11 HANGERS AND SUPPORTS

A. Contractor shall provide all hangers and supports for supporting all conduit, gutters, cabinets, and equipment of all types. All hangers and supports shall be secure and of a type appropriate in design, application, and dimensions for the particular application.

B. Hangers and supports for exterior applications and in wet locations shall be stainless-steel. Hangers and supports for interior applications shall be zinc-plated steel.

C. Concrete inserts shall be malleable iron concrete inserts. Selection of inserts shall be made with a minimum safety factor of 100% over published load ratings.

D. Perforated hanger strap and wire will not be acceptable for any supporting purpose.

1.12 PAINTING

A. Electrical Contractor shall touch-up or refinish if so, directed by the Architect any panels, cabinets, switchboards, fixtures, and other equipment furnished with a factory finish which shall become damaged in shipment or installation.

1.13 CONDUCTORS

A. All wiring and cables shall be insulated soft-drawn annealed 98% conductivity copper and shall be new. Voltage rating of wire and cable operating on voltages in excess of 50 volts shall be 600 volts A.C. For circuits operating on voltage less than 50 volts, the voltage rating shall be not less than 300 volts A.C.

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B. All wire No. 12 AWG and smaller shall be solid and wire of larger size shall be stranded unless otherwise specified herein. Stranded wire will not be permitted for termination at wiring devices rated 20 amperes or less.

C. Power feeder and branch circuit wire and cables shall have insulation Type THWN unless indicated otherwise on Drawings. Standard wire size for interior applications shall be No. 12 AWG copper and this size shall be used except where other sizes are indicated on the Drawings, otherwise specified herein, or otherwise required by the Code. Standard wire size for exterior/ underground applications shall be No. 10 AWG copper and this size shall be used except where other sizes are indicated on the Drawings, otherwise specified herein, or otherwise required by the Code. On any run 100 feet in length or longer, No. 10 AWG copper shall be used in place of No. 12. Feeder cables shall be identified by suitable tags where they pass through pull boxes. Conductors as manufactured by Cablec, Capitol, American Insulated, Houston Wire and Cable, Southwire, and Okonite will be acceptable.

D. All wire for special systems and special conditions shall be as specified and/or as indicated on the Drawings.

1.14 WIRE PULLING LUBRICANTS

A. Contractor shall use Ideal “CableEase" or approved equal wire pulling lubricants for all wire installation. Soaps or other substitute material having electrical conduction properties are not acceptable.

1.15 COLOR-CODING AND TAGGING

A. All wiring furnished shall be color-coded. Conductors No. 10 AWG and smaller shall have insulation colored as follows. Conductors larger than No. 10 AWG may be black with tape manufactured for this application and colored as follows. All such conductors shall be color-code taped at all junctions and terminations.
   1. 120/208 volt, 3-phase:
      a. Phase A – Black.
      b. Phase B – Red.
      c. Phase C – Blue.
      d. Neutral – White.
   2. 277/480 volt, 3-phase:
      a. Phase A – Brown.
      b. Phase B – Purple.
      c. Phase C – Yellow.
      d. Neutral – Gray.
   3. Switched legs: Phase color with white tracer.
   4. Ground conductors: Green.

B. All control wiring shall be color-coded, and the same color shall be used for the same circuit throughout the system, and a different color shall be used for each separate control function.

C. Identification shall be accomplished by means of Brady "Quick-Labels" or approved equal attached permanently to all wire requiring identification in addition to the color-coding. Acceptable manufacturers: Thomas and Betts, Ideal.

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1.16 INSULATION OF SPLICES AND CABLE TERMINATION

A. All connections for conductors No. 8 and larger must be made by means of a compression type connector UL listed and specifically approved for the purpose for which it is used. Such connectors shall be Polaris or equal insulated NSI type lug blocks. Wire No. 10 and smaller may be connected with U.L. listed wire nuts in lieu of compression connections.

1.17 OUTLET AND SWITCH BOXES

A. All boxes shall be galvanized and shall be set with covers flush and square with the finished surface.

B. Boxes set flush in wall sheathing, CMU and plaster finished walls shall be 4" square boxes 1 1/2" deep or deeper with raised plaster ring depth to match wall sheathing or CMU thickness. The gap space between the front of installed plaster rings and the outside surface of wall sheathing shall not exceed that mandated by NFPA 70 (N.E.C.) code.

C. Flush outlet boxes shall be used on all walls and ceilings in finished out spaces where conduits are concealed. Where conduits are exposed, surface type boxes shall be used.

D. Surface mounted outlet boxes in unfinished areas shall be 1900 type boxes with galvanized industrial raised coverplates.

E. Where new outlet boxes are to be installed flush in existing wall sheathing, such outlet boxes shall be zinc plated steel retrofit type outlet boxes with ears and concealed fasteners to securely attach boxes to existing wall sheathing.

F. All boxes shall be securely attached to the structural members.

G. Junction boxes and pull boxes shall be furnished where indicated on the Drawings, or as required by the National Electrical Code. Boxes shall be of code gauge galvanized steel, and shall have removable screw cover.

H. Any boxes not installed in a workmanlike manner shall be removed by contractor, wall repaired, and box reset.

I. Boxes and conduit fittings for outdoor work shall be cast aluminum, watertight, and have gasketed coverplates.

1.18 LOCATION OF OUTLET BOXES

A. Contractor shall determine from the complete dimensioned Architectural Drawings, the electrical details and Drawings, and from other contractors, the locations of all pieces of equipment prior to locating any outlet boxes or devices.

B. All outlet boxes, devices, etc., shall be located so as to be clear of equipment, permanent fixtures, building trim, etc. If the exact location of any equipment is not clearly defined, the contractor shall request direction from the Architect prior to locating the facilities for the equipment.

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C. Locations of services for equipment connections shall be determined accurately from certified shop drawings on equipment to be served, or from actual measurements of the equipment itself.

D. Outlet boxes for receptacles and light switches shall be mounted with long axis of the box vertical unless otherwise indicated on the Drawings.

E. Size and location outlet boxes for special and/or recessed equipment shall be obtained from the equipment manufacturer supplying the equipment.

1.19 HEIGHT OF OUTLETS

A. The following table shall act as a general guide to aid the contractor in locating elevations of outlet boxes where such elevations are not specifically indicated on the Drawings.

OUTLET	LOCATION	ABOVE FLOOR TO TOP OF BOX
Convenience Receptacles	Walls in general	18" or as directed by Architect
Convenience Receptacles	Walls at work benches	42" or as directed by Architect
Switches	Walls	48" on strike of door

B. The exact location of all outlets shall be as approved by the Architect who reserves the right to change the position of any outlet by a distance of five feet in any direction, from the position indicated on the Drawings before work is roughed-in, without extra charge. Outlet heights are indicated in these Specifications as a guide. Regardless of heights indicated, the contractor is ultimately responsible for confirming that all final outlet locations are in compliance with the requirements of Texas Architectural Barriers Act and Title III Provisions of the Americans with Disabilities Act.

1.20 WIRING DEVICES

A. Wiring devices, or approved equal, as scheduled and/or indicated on the Drawings shall be furnished and installed. All receptacles shall be grounding type, and shall be polarized in accordance with the latest standards of the National Electrical Code.

B. Coordinate device color with Architect prior to acquisition of devices.

1.21 COVERPLATES

A. All coverplates for switches, receptacles and other wiring devices, except as hereinafter specified, shall be satin finish, Type 302 brushed stainless steel.

B. All coverplates shall have matching screws.

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C. Coverplates for exterior wiring devices and wiring devices in wet locations shall be rain-tight while-in-use type die cast covers.

1.22 DISCONNECT SWITCHES

A. All disconnect switches shall be Square D Type GD for 240 volt use and Square D Type HD, or approved equal, for 480 volt use, quick-make quick-break type safety switches with cover interlocked door.

B. All switches on exterior of building and in damp or wet locations shall be in NEMA 3R enclosures.

C. All motors and fixed equipment connections shall have disconnects as required by the National Electrical Code.

D. All disconnect switches shall have the load served by the switch identified by 1/8" thick white thermoplastic with black (3/4" stroke) sunken letter nameplate screwed or riveted to outside cover of the switch.

E. Disconnect switches as manufactured by Eaton and Siemens will be acceptable.

1.23 LOAD CENTERS

A. Contractor shall furnish the load centers as indicated on Drawings, and riser diagram. Load centers shall be complete with door and trim. Branch circuits shall be equipped with plug-on type automatic circuit breakers for each circuit. Load centers shall bear the Underwriter's Laboratories, Inc., seal of approval. Load centers shall have tin plated copper bussing with capacity as indicated. Lugs shall be UL listed to accept solid or stranded copper and aluminum conductors.

B. Load centers shall be Square D Type QO with QO circuit breakers or equal for 120/240 volt use. Multi-pole breakers shall be one handle common trip.

C. Isolated ground bar (where required in addition to equipment ground bar) shall be insulated from load center enclosure.

D. Branch circuits as indicated on the Drawings shall be connected to the corresponding breaker number of the load center insofar as possible. Each circuit bearing load shall be identified on a typewritten directory card inside the door of the load center. Spare circuit breakers and spaces shall be hand written in pencil on directory card.

E. Load Center by Eaton and Siemens will be acceptable.

1.24 LIGHTING FIXTURES

A. Lighting fixtures as hereinafter specified and as indicated on the Drawings shall be furnished and installed by the contractor. Installation details and scheduled information indicated on the Drawings describe the requirements of each fixture type and shall apply where applicable.

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B. Recessed fixtures shall be installed in complete compliance with all applicable codes and with the requirements these Specifications.

C. Supports of adequate capacity and rigidity shall be provided for all fixtures. Also, refer to "Hanger and Supports" Section of these Specifications.

D. All fixtures in areas with suspended acoustical tile ceilings shall be supported to structural system independent of the acoustical tile suspension system. All fixtures in other type ceilings shall have fixture support independent of the ceiling provided where required by weight or size of the fixtures.

E. Alignment of lighting fixtures and ceiling diffusers shall be carefully coordinated on the job. Where ceiling diffusers are located on ceilings, locate light fixtures symmetrical with diffusers.

F. Continuous row mounting shall be provided as indicated on the Drawings, with the necessary connectors, joining strips, etc., to form a neat compact joint and to maintain a straight line of fixtures.

G. Contractor shall test all fixtures containing emergency battery packs and submit a report indicating the time and date emergency fixtures were tested, the name of personnel who performed the test, and the results of the test. The test report shall be included within the Operation and Maintenance manual submittal.

H. LED light engines and drivers shall be factory installed for all fixtures.

I. Values of life expectancy, input power, output frequency, power factor, and total harmonic distortion for LED drivers and light engines shall be equivalent in all respects to the values of drivers and light engines selected by scheduled information on the Drawings.

J. Locations and elevations indicated on the Drawings for exterior wall pack fixtures are intended to serve as a general guide. Contractor shall verify the exact location and elevation of all such fixtures with the Architect prior to the installation of rough-in for same.

K. All directional distribution type fixtures with narrow x long type distribution shall be mounted such that long axis of distribution is parallel with long axis of area to be illuminated.

L. Where wall mounted emergency fixtures (other than exit signage) are located in exposed structure areas, such fixtures shall be located 1'-0" below lowest structural roof members. Where such fixtures are located in areas with ceilings, fixture elevation shall be 6" below ceilings. Where such fixtures are located in spaces which have multi-level ceiling heights and/or structure, all fixtures shall be located at the same elevation (6" below) which shall be established by the lowest ceiling or structural member elevation.

M. Data furnished on lighting fixtures shall indicate specifically by manufacturer their compliance with the above special requirements where applicable. If this information is not provided, the data cannot be accepted.

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N. Substitutions may be offered by the contractor, provided the substitute fixture is equal to the specified fixture in performance, physical appearance, mechanical features and efficiency. All proposed substitute lighting fixtures must comply with prior approval requirements as stipulated by other sections of the specifications.

1.25 LIGHTING CONTROLS

A. The Electrical Contractor shall furnish and install lighting controls indicated on Drawings. All lighting control devices and components shall be installed and programmed in accordance with the manufacturer's installation instructions.

B. The Electrical Contractor shall be responsible for contacting the lighting controls manufacturer or manufacturer's representative to obtain all necessary literature and diagrams needed to install and interconnect the lighting controls indicated on the Drawings.

C. The Electrical Contractor shall include the cost within their proposal to provide start-up, programming, installation of lighting control software, testing, and Owner training by the manufacturer's representative. Electrical Contractor shall not self start-up, program, or test the lighting control devices and components without the manufacturer's representative present. The Electrical Contractor shall provide a copy of the manufacturer's representative's testing report to the Commissioning Agent prior to lighting commissioning of the entire lighting control system.

D. Lighting control devices and components shall be installed and programmed in accordance with the 2015 International Energy Conservation Code.

E. All secondary power conductors utilized for lighting controls are rated as Class 2 electrical circuits. This shall include any cable utilized for lighting controls. Per NFPA 70 (National Electrical Code) Class 2 electrical circuits shall be installed in accordance with Part I of Article 300 and with the wiring methods from appropriate Articles in Chapter 3. All splices in any cable utilized for lighting controls shall be made in an approved junction box per Article 300.15 in the N.E.C.

F. All Cat 5 and Cat 6 cables shall be continuous from lighting control device to end of line as indicated on the Drawings. Cat 5 and Cat 6 cables shall not be physically spliced or joined (using wire nuts, crimp connectors, etc.) together for any reason. The only acceptable junction allowed is a Y – connector (with RJ-45 jacks) supplied with occupancy sensors by the manufacturer.

G. All exterior building mounted fixtures shall be controlled by a time sequence and photoelectric cell combination as required by 2015 IECC. This control requirement can be accomplished by either a mechanical/electronic time clock and Photocell or by a dedicated BAS control point. Refer to drawings for specific control requirement.

H. All spaces (except restrooms) with occupancy sensors shall be programmed to automatically turn the lighting fixtures off after a period of 30 minutes with no activity detected. Upon detection of motion or sound the occupancy sensor shall be programmed to activate the lighting fixtures within a space to not more than 50% of its rated output.

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I. Occupancy sensors installed in restrooms shall provide 100% output of the rated fixtures within the space when detection of motion or sound activates the sensor.

J. Wall mounted occupancy sensors shall be installed as indicated on the Drawings.

K. Wall mounted timer switches shall be installed as indicated on the Drawings.

L. Lighting control submittals shall include a written sequence of operation and data for all devices and cabling furnished. The submittals shall provide typical wiring diagrams for all components furnished.

1.26 LIGHTING CONTROL COMMISSIONING – CONTRACTOR RESPONSIBILITY

A. The lighting controls shall be tested/commissioned by an organization contracted directly by the Owner. The testing shall include evidence that the lighting control hardware and software are calibrated, adjusted, programmed, and in proper working condition in accordance with the construction documents and manufacturer's instructions. Functional testing shall be in accordance with Sections C408.3.1.1, C408.3.1.2, and C408.3.1.3 of the 2015 IECC for the applicable control type. Documentation shall be furnished as required by Section C408.3.2 of the 2015 IECC.

B. The contractor shall confirm that the lighting control system start-up and testing is complete with the lighting manufacturer's representative prior to the 3rd Party Commissioning Agency arriving to the site for commissioning.

C. The Owner shall provide commissioning of the lighting control system through a Commissioning Agency. The electrical contractor shall assist the Owner and 3rd Party Commissioning Agency as required to perform the lighting control commissioning prior to final acceptance of the project. All labor and materials necessary to assist the Owner and 3rd Party Commissioning Agency shall be included within the base proposal for the project.

1.27 CONTROL EQUIPMENT, WIRING, AND CONNECTIONS

A. The HVAC or BAS Contractor shall furnish and install the Building Automation System (BAS).

B. Electrical Contractor shall furnish and install the following electrical apparatus associated with the ventilation control system including control wiring and terminations.
   1. Control wiring and terminations from lighting occupancy sensors to fan control panels to trigger fan high speed function.

C. Electrical Contractor shall provide power wiring and terminations as required for control equipment furnished and installed by the HVAC and/or BAS Contractor. Electrical Contractor shall provide rough-in outlet boxes and conduit for the BAS system. Refer to the BAS rough in paragraph of these specifications for requirements.

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1.28 WIRING OF MOTORS

A. All motors specified under other divisions of the Specifications will be furnished by the respective contractor. Electrical shall provide all power wiring and connections to same. See the Control Equipment, Wiring, and Connections Section of these Specifications.

1.29 CIRCUITING

A. Contractor shall connect all wires so as to provide the arrangement of circuits indicated on the Drawings.

1.30 IDENTIFICATION AND LABELING OF DISTRIBUTION GEAR

A. Contractor shall furnish white thermoplastic (1/8" thick) with black sunken letters (3/4" font) for all panelboards, load centers, transformers, and disconnect switches. Labels shall be permanently attached to service side of all such gear.

B. Identification and labeling of individual branch circuit devices shall be provided as hereinafter specified.

1.31 SPACES AND SPARES

A. Where spaces are indicated on the Drawings for load centers, and panelboards, all such spaces shall be completely equipped provisions such that future installation of overcurrent devices requires no accessory apparatus.

B. Where spares are indicated on the Drawings for load centers, and panelboards, all such spares shall be completely equipped and line side connected devices, such that future use of same requires load side connection only.

1.32 PANEL DIRECTORIES

A. At all new panels the branch circuits as indicated on the Drawings shall be connected to the corresponding breaker number of the panels insofar as possible. Each circuit bearing load shall be identified on a typewritten directory card inside the door of each panel. Spare circuit breakers and spaces may be hand written in pencil on the directory card.

B. Existing panels directories at panels where no loads are changed and no new loads are added may remain as-is.

C. At existing panels where circuits/loads are modified or added, existing directory cards shall be replaced by new typewritten directory cards. Such new directory cards shall indicate all new and existing load conditions on a per circuit basis. New equipment designations indicated on the Drawings shall be used to identify all new load conditions. Existing load designations may be utilized to identify existing load conditions. Where the accuracy of existing load designations are questionable; provide circuit tracing as required to properly identify such existing loads.

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1.33 PANELBOARDS AND CABINETS

A. Contractor shall furnish all panelboards as indicated on Drawings, and riser diagrams. Panelboards shall be of dead-front type and shall be complete with lockable door and trim. Each door shall be equipped with spring latch and tumbler-lock. All locks shall be keyed alike and two keys shall be provided to the Owner for each lock. Cabinets shall be 20" wide code gauge steel and boxes shall be galvanized. Each panel shall have main lugs and/or main breakers as indicated. Branch circuits shall be equipped with bolt-on type automatic circuit breakers for each circuit. Panelboards shall bear the Underwriter's Laboratories, Inc., seal of approval. All panelboards shall have tin plated copper bussing with capacity as indicated. Lugs shall be UL listed to accept solid or stranded copper and aluminum conductors.

B. Panels shall be Square D Type NQ with QOB circuit breakers or equal for 120/208 volt use, and Type NF with EDB circuit breakers or equal for 277/480 volt use. Multi-pole breakers shall be one handle common trip.

C. Panelboards shall have 100% rated copper neutral bus and copper ground bar.

D. Branch circuits as indicated on the Drawings shall be connected to the corresponding breaker number of the panels insofar as possible. Each circuit bearing load shall be identified on a typewritten directory card inside the door of each panel. Spare circuit breakers and spaces shall be hand written in pencil on directory card.

E. Series rating for circuit breakers in panels is not acceptable, all circuit breakers shall be fully rated.

F. Panelboards by Eaton and Siemens will be acceptable.

1.34 GENERAL PURPOSE DRY TYPE TRANSFORMERS

A. The general purpose dry type distribution transformers indicated on the Drawings shall be 3-phase, 60 cycle, air insulated and air cooled, 2-winding, dry type, of the capacity as indicated. Primary shall be 480 volts with standard taps and secondary shall be 120/208Y volts. 480 volt supply is obtained from a grounded wye source and the secondary of the transformer shall be connected to the source neutral.

B. Transformers 25 KVA and above shall be 150 degrees C. temperature rise above 40 degree C. ambient. All insulating materials to be in accordance with NEMA ST20-1972 Standards for a 220 degrees C. UL component recognized insulation system.

C. Transformer coils shall be of the continuous wound construction and shall be impregnated with non-hygroscopic, thermo-setting varnish.

D. Enclosure shall be designed for floor mounting except where wall mounting is indicated on the Drawings. Provide rain shields for all transformers to be installed outdoors. All wiring to the transformer shall be completely enclosed in conduit and the transformer case. Transformers shall meet the latest requirements of the ASA and NEMA, and shall have inorganic silicone insulation for operation of 150 degrees C. temperature rise.

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E. Transformer noise levels shall be within standards published by NEMA ST20 and ANSI C89.2. Each transformer conduit connection shall have a 24" section of flexible "Sealtite" conduit adjacent to the transformer to help prevent vibration transmission to the building.

F. Isolation Mounts: Transformers shall be mounted on Korfund Type VPS elasto-rib damper isolator bases having integral load distribution top plate.

G. Transformers shall be Square D, Eaton, Siemens or approved equal.

H. The grounding conductor for interior transformers shall utilize a CGB connector where such conductor enters the transformer housing. The grounding conductor for exterior transformers shall be installed in specified conduit from the transformer housing to the grounding electrode.

1.35 CONNECTIONS TO EQUIPMENT SPECIFIED ELSEWHERE OR BY THE OWNER

A. Certain equipment will be furnished by the Owner or other contractors on the job which will require electrical services and connections by the Electrical. Contractor shall refer to the "Disconnects", and "Control Equipment, Wiring, and Connections", "Wiring of Motors", and the "Location of Outlet Boxes" Sections of these Specifications.

B. HVAC equipment such as ventilation equipment, packaged terminal air conditioning (PTAC) units, air handling unit, condensing unit, etc., shall be furnished and installed by the HVAC Contractor. Electrical services indicated on the Drawings are based on the requirements of specified HVAC equipment. Attention is directed that in the event the HVAC Contractor furnishes equipment other than specified, changes may be required to accommodate the electrical load and quantity of electrical connections for such furnished equipment. Electrical Contractor must coordinate changes resulting from differences between the specified and furnished HVAC equipment and advise the HVAC Contractor of any additional costs. HVAC Contractor shall be responsible for paying all costs involved as a result of the changes.

C. Electric water heaters and other equipment will be furnished and installed by the Plumbing Contractor. Electrical shall provide electrical connections in accordance with vendor furnished drawings.

D. Certain equipment will be furnished by Owner and under other sections of the Specifications. Equipment connections will be based on vendor furnished drawings, or actual requirements of equipment. This includes scoreboard, 25 second play clocks, etc.

1.36 ELECTRIC HAND DRYERS

A. Contractor shall furnish and install where indicated on Drawings. Electrical characteristics shall be 115 volts, single phase, 60 Hertz, 950 Watts, 20 ampere rated overcurrent protection. Electric hand dryers shall be Excel Thin-Air Model No. TA-***-120 (*** - color selection by Architect from standard color selections).

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1.37 IT/DATA TRANSMISSION ROUGH-IN SYSTEM

A. Provide a partial IT/data transmission rough-in system with a Jetline pullcord in each conduit. Minimum conduit size shall be 1-1/4".

B. Conduit shall extend from each rough-in outlet box to point above accessible ceiling, or as indicated.

C. Provide a blank coverplate for all rough-in outlet boxes.

D. Provide plastic bushing at each conduit stub.

E. Furnish and install extensions and modifications of existing service raceways as indicated on the drawings and as required.

1.38 BAS ROUGH IN SYSTEM

A. Provide a partial BAS rough-in system with a Jetline pullcord in each conduit. Minimum conduit size shall be 3/4". Refer to mechanical drawings for locations for outlet boxes for BAS system devices. Coordinate all BAS outlet box locations with the BAS system contractor.

B. Conduit shall extend from each rough-in outlet box to point above accessible ceiling, or as indicated.

C. Provide a blank coverplate for all rough-in outlet boxes.

D. Provide plastic bushing at each conduit stub.

1.39 ACCESSORY CONSTRUCTION APPARATUS

A. It is the intention that these Specifications shall provide a complete installation, except as herein specifically excepted. All accessory construction and apparatus necessary or advantageous in the operation or testing of the work shall be included. Omission of specific references to any part of the work necessary for such complete installation shall not be interpreted as relieving the contractor from furnishing such work.

1.40 TESTS/DEMONSTRATION

A. The entire system upon completion shall be "Meggered" for faults in accordance with methods approved by I.E.E.E. and National Electrical Code if so directed by the Engineer.

B. A demonstration shall be performed in the presence of a representative of the Architect. Equipment installed and/or connected by the contractor shall be put through their normal operating paces and all such equipment shall be required to operate to the satisfaction of the Architect on completion of the job.

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1.41 INSTRUCTIONS

A. Contractor shall provide for instructing an employee or employees of the Owner in the operation and maintenance of the systems. Duplicate sets of manufacturer's certified drawings, specifications, operating instructions, maintenance manuals, and maintenance instructions on all equipment furnished by contractor shall be furnished to the Owner.

1.42 WORKMANSHIP AND INSTALLATION

A. Contractor shall have his choice as to the location of conduits, pull boxes, etc., except for locations set by dimensions on Drawings, provided his choices do not interfere with piping, fixtures, and equipment installed by other contractors working on the same project, and do not interfere with the characteristic features of the building. In cases of such interference, the Architect will determine the locations of the interfering items.

B. Contractor shall make such progress in his work that he will not delay the work of other trades unduly.

C. Contractor shall provide service to all using connections.

D. Cutting of any structural member, regardless of material, shall be kept at a minimum. Contractor shall pay for repairing damage to such members.

E. All electrical fixtures and fittings of all types shall be properly supported to construction.

END OF SECTION 26 00 00

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SECTION 28 31 00 - FIRE DETECTION AND ALARM SYSTEM

1.1 GENERAL

A. Sections 20 00 00 and 26 00 00 are a part of these Specifications for Stadium Improvements, Calallen Independent School District, Corpus Christi, Texas. All applicable conditions and requirements of Sections 20 00 00 and 26 00 00 and conditions of the contract shall apply to this Section of the Specifications.

B. This Section of the Specification includes the furnishing, installation, connection, and testing of the microprocessor controlled, conventional fire alarm equipment required to form a complete, operative, coordinated system. It shall include, but not be limited to, alarm initiating devices fire alarm control panel (FACP), auxiliary control devices and wiring as indicated on the Drawings and specified herein.

C. Fire alarm system shall comply with requirements of the latest adopted version of the NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this Specification. The system shall be electrically supervised and monitor the integrity of all conductors.

D. The fire alarm system shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQC Q9001-1994.

E. The Owner has adopted a policy to standardize fire alarm systems in its facilities to Notifier. For this reason, fire alarm system equipment and components specified herein are by Notifier. Substitute system equipment and components by other manufacturers will not be considered. Fire alarm control panel and peripheral devices shall be manufactured 100% by Notifier (or division or affiliate thereof).

F. The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

1.2 SCOPE

A. Fire alarm system design by the fire alarm contractor shall be based upon 2021 IFC and 2019 NFPA 72.

B. Contractor shall provide a conventional fire alarm system for elevator monitoring and control.

C. Systems shall be designed such that each initiating device circuit (IDC) is limited to only 80% of its total capacity at initial installation.

D. Basic Performance: All basic performance characteristics and functions of the Notifier SFD-5UD fire alarm control panel are hereby adopted by reference as the specified performance requirements.

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E. Basic System Functional Operation:
1. When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:
a. The system alarm LED on the fire alarm control panel shall flash.
b. A local piezo electric signal in the control panel shall sound.
c. A backlit 80-character LCD display on the fire alarm control panel shall indicate all information associated with the fire alarm condition, including the type of designated alarm point.
d. The fire alarm control panel history storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.
e. All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (relays) shall be activated.
f. Initiate elevator control sequences as required by applicable codes.
g. Activate auto dialer (internet protocol digital alarm communicator/transmitter) to place call (pre-programmed message) to the proper emergency agency.

1.3 SUBMITTALS

A. Fire alarm equipment and devices indicated on the Drawings and specified herein are intended to illustrate the general extent and character of system requirements. Specific wiring between equipment/devices has not been indicated. Location and quantity of devices indicated are intended to only be used as general guide. The Fire Alarm Contractor shall design and submit for approval, a complete designed system configuration and layout. The complete configuration shall include all devices, wiring, conduit, and locations along with other required information as specified herein for the system proposed for installation. No additional compensation will be considered if the Fire Alarm Contractor submits the issued construction drawings by this firm for approval to the AHJ.

B. Electronic and Physical submittals shall be organized in the following manner.
1. Physical submittals shall be bound in a commercial quality 8-1/2” by 11” three D side ring binders with durable plastic covers.
2. Cover page indicating the Contractor’s name, Project name, and contents of submittal.
3. Table of contents keyed indicating the respective product data included within submitted brochure.
4. All data submitted shall be identified (highlighted, circled, or pointed at with an arrow) on its respective sheet if more than one device/component is indicated on such sheet.
5. Keyed Tab Format Example is as follows:
a. Tab 1: Bill of Material.
b. Tab 2: Equipment (fire alarm control panel)
c. Tab 3: Battery Calculations
d. Tab 4: Initiating Devices (smoke/heat detectors).
e. Tab 5: Control Relays.
f. Tab 6: Surge Suppression (for fire alarm control panel).
g. Tab 7: Miscellaneous Material

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h. Tab 8: Shop Drawings (floor plan Drawings locating and naming each device, control panel configuration including wiring and interconnection schematics as required by Texas Insurance Code, Chapter 6002, and Rule 34.619.
i. Tab 10: State Fire Alarm License of Installer (all licensed fire alarm technicians whom will take part in the installation of the fire alarm system).

C. Operation and Maintenance Manuals:
1. Operation and Maintenance Manuals (O&M) shall include all items listed within the electronic and physical submittals listed above. The format of the O&M Manuals shall comply with the electronic and physical submittals listed above, however, the shop drawings under tab 8 shall be replaced with a stamped copy of the submittal drawings reviewed by the AHJ.
2. Keyed Tab Format Example is as follows:
a. Tab 1: Bill of Material and Recommended Spare Parts.
b. Tab 2: Equipment (fire alarm control panel).
c. Tab 3: Battery Calculations:
d. Tab 4: Initiating Devices (smoke/heat detectors).
e. Tab 5:.Control Relays.
f. Tab 6: Surge Suppression (for fire alarm control panel).
g. Tab 7: Miscellaneous Material
h. Tab 8: Shop Drawings (AHJ approved and stamped).
i. Tab 9: State Fire Alarm License of Installer (all licensed fire alarm technicians whom took part in the installation of the fire alarm system).
j. Tab 11: “As-Built” shop Drawings (Indicates all installed devices, **actual installed cable routing**, and the installed location of each addressable device).
k. Tab 12: Operation and Maintenance Instruction Manuals
l. Tab 13: Programming Matrix (defining all input/output functions and zoning).
m. Tab 14: State Certification for Building.
n. Tab 15: Pre-Test Forms (all pre-test forms required by NFPA 72, and a copy of the test forms submitted to the AHJ).
o. Tab 16: AHJ Inspection Certificates

D. The Contractor shall submit an electronic copy of the O&M Manuals for review by the Engineer. After all comments from the Engineer have been remediated, the Contractor shall submit one physical copy of the O&M Manuals for final review by the Engineer to confirm all items above are included within the physical copy. After all comments, pertaining to the physical copy, from the Engineer has been remediated, the Contractor shall provide the following:
1. Two (2) – physical copies of the entire O&M Manual.
2. Five (5) – printed sets of “As-Built” Drawings as described herein for the Owners use.
3. One (1) – physical set of “As-Built” Drawings at the main fire alarm control panel, each power supply, voice evacuation panel, and fire alarm amplifier cabinet. The Drawings shall be installed in a wall mounted plastic holder (furnished by the Contractor) adjacent to the respective equipment. In locations where two (2) – or more pieces of equipment exist in the same location, one (1) – set of Drawings in a wall mounted plastic holder will be sufficient.

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4. A flash drive with electronic copies all of the items listed above (1.3.D.2.a through 1.3.D.2.p).

1.4 SOFTWARE MODIFICATIONS

A. Provide all hardware, software, programming tools, and documentation necessary for future modification of the fire alarm system software on site by the Owner. Modification includes addition and deletion of devices, circuits, zones, and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of future software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.

1.5 WARRANTY

A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of Final Acceptance. Full cost of maintenance, labor, and materials required to correct any defect during this one (1) year period shall be included in the submittal bid.

1.6 POST CONTRACT MAINTENANCE

A. Complete maintenance and repair service for the fire alarm system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of five (5) years after expiration of the warranty.

B. As a part of submittal data, include written commitment that the services of a factory trained and authorized technician will be available to perform future system software modifications, upgrades, or changes. Commitment shall state that response time of the technician to the site shall not exceed 24 hours.

1.7 POST CONTRACT EXPANSIONS

A. Contractor shall have the ability to provide parts and labor to expand the system specified, if so requested, for a period of five (5) years from the date of acceptance.

1.8 APPLICABLE STANDARDS AND SPECIFICATIONS

A. Specifications and standards listed below form a part of this Specification. The system shall fully comply with the latest adopted version of the following applicable standards.

B. National Fire Protection Association (NFPA) - USA:
1. No. 72 National Fire Alarm Code
2. No. 101 Life Safety Code

C. International Building Code including International Fire Code and all applicable standards/codes adopted by reference.

D. Underwriters Laboratories, Inc. (UL) - USA:
1. No. 268 Smoke Detectors for Fire Protective Signaling Systems.
2. No. 864 Control Units for Fire Protective Signaling Systems.

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3. No. 268A Smoke Detectors for Duct Applications.
4. No. 521 Heat Detectors for Fire Protective Signaling Systems.
5. No. 464 Audible Signaling Appliances.
6. No. 38 Manually Actuated Signaling Boxes.
7. No. 346 Waterflow Indicators for Fire Protective Signaling Systems.
8. No. 1971 Visual Notification Appliances.

E. Local and State Building Codes.

F. Americans with Disabilities Act.

G. Texas Accessibility Standards.

H. All requirements of the Authority Having Jurisdiction (AHJ).

1.9 EQUIPMENT AND MATERIAL, GENERAL

A. All equipment and components shall be new, and the manufacturer's current model. Materials, appliances, equipment, and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code.

B. All equipment and components shall be installed in strict compliance with manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.

C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

1.10 WIRE AND CONDUIT

A. The Fire Alarm Contractor shall be responsible for furnishing all required rough-in and conduit necessary for the fire alarm system if the Fire Alarm Contractor is contracted directly to the General Contractor. The Electrical Contractor shall be responsible for furnishing all required rough-in and conduit necessary for the fire alarm system if the Fire Alarm Contractor is contracted to the Electrical Contractor. All rough-in and conduit shall be installed in accordance with Specification Section 26 00 00.

B. Wiring installed in inaccessible space and wiring exposed to view in unfinished spaces, such as mechanical rooms, exposed ceiling areas, and storage areas, shall be installed in conduit. Wiring installed above accessible ceilings may be run exposed. All wiring run exposed in plenum space shall be plenum rated cable. All wiring run exposed shall be supported by J-Hooks furnished by the Contractor. All wiring run exposed shall be neatly bundled and supported to the building structure and supported vias J-Hooks at minimum of 6'-0" intervals.

C. Fire alarm cabling shall be routed clear of any equipment or components above accessible ceilings as required to allow accessibility and removal of such equipment or components.

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D. Where conduit is run from wall mounted outlet boxes to above ceilings and conduit is open-ended above ceilings in non-plenum space, all such raceway openings shall be sealed airtight after fire alarm cable is installed. All sealing material shall be pliable and readily removable. Where conduit openings are located in plenum space, sealing is not required.

E. Conduit fill shall not exceed 40% of interior cross-sectional area where three (3) or more cables are contained within a single conduit.

F. Fire alarm cabling shall be routed from the control panel directly to the respective devices without splices. All fire alarm terminations shall only occur at the respective device. Fire alarm cable splices above accessible ceilings is not permitted. If fire alarm cable splices above accessible ceilings are necessary, all such splices shall be submitted and approved by the Engineer.

G. Cable must be separated from any conductors of electric light, power, Class 1 circuits, non-power-limited fire alarm, and medium-power network-powered broadband communications and shall not be placed in any conduit, junction box, raceway, or cable tray containing these conductors, per N.E.C. Article 760.136.

H. All fire alarm system wiring shall be new.

I. All fire alarm cabling shall be red.

J. Wiring shall be in accordance with local, state, and national codes (e.g., N.E.C. Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than No. 18 AWG (1.02 mm) for Initiating Device Circuits.

K. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.

L. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).

M. All field wiring shall be electrically supervised for open circuit and ground fault.

N. Terminal Boxes, Junction Boxes and Cabinets: All boxes and cabinets shall be UL listed for their use and purpose.

O. Fire alarm control panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit and all associated appurtenances shall be furnished and installed by the Electrical Contractor. This circuit shall be labeled at the branch circuit panel as FIRE ALARM. Fire alarm control panel primary power wiring shall be No. 12 AWG. Control panel cabinet shall be grounded in accordance with Article 250 of the N.E.C. Grounding shall be furnished and installed by the Electrical Contractor.

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1.11 MAIN FIRE ALARM CONTROL PANEL

A. Fire alarm control panel shall be a NOTIFIER Model SFP-5UD and shall contain a Central Processing Unit (CPU). The CPU shall communicate with and control system devices. All system features and capabilities of the NOTIFIER Model SFP-5UD are hereby adopted by model reference.

B. The main fire alarm control panel shall be equipped with surge suppression. Surge suppression unit shall be Ditek Model No. DTK-DF120S1 or approved equal.

1.12 SYSTEM COMPONENTS - CONVENTIONAL DEVICES

A. Field Devices:
   1. Heat Detector: Provide Honeywell Cat. No. 302-AW-135 series rate-anticipation heat detector probe. Heat detectors shall be rated at 135 degrees F.
   2. Smoke Detector: Fire alarm smoke detector shall be Notifier Cat. No. 2151 or System Sensor Cat. No. 2W-B.
   3. Control Relay: Control relay shall be Notifier Cat. No. N-ANN-RLY 8-zone relay module.

1.13 BATTERIES

A. Batteries shall be 25 amp/hour sealed Gel Cell type, 12-volt nominal (two required).

B. Battery shall have sufficient capacity to power the fire alarm system for not less than 24 hours plus five (5) minutes of alarm upon a normal AC power failure.

C. Batteries are to be completely maintenance free. No liquids are required. Fluid level checks for refilling, spills, and leakage shall not be required.

1.14 INSTALLATION

A. Detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

1.15 TEST

A. Service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72, Chapter 7.

B. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

C. Open initiating device circuits and verify that the trouble signal actuates.

D. Open and short signaling line circuits and verify that the trouble signal actuates.

E. Open and short notification appliance circuits and verify that trouble signal actuates.

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F. Ground all circuits and verify response of trouble signals.

G. Check installation, supervision, and operation of all conventional field devices during the walk test.

H. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the fire alarm control panel and the correct activation of the control points.

I. Check all interlocks with the elevator control system to verify proper control of elevator equipment.

J. When the system is equipped with optional features, the manufacturer's manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

1.16 FINAL INSPECTION

A. At the final inspection, a factory trained representative of the manufacturer of the major equipment shall demonstrate that the system functions properly in every respect. The system shall be run through simulated detection and alarm sequences in the presence of a representative of the Architect. The system must be demonstrated to the satisfaction of the Architect prior to final acceptance. Time and date of demonstration shall be that which is approved by the Architect.

1.17 INSTRUCTION

A. A minimum of three (3) hours of instructional sessions shall be provided to personnel of the Owner to educate the Owner in proper operation, maintenance, and programming of the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided. Time and date of instructional sessions shall be selected by the Owner.

B. Contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation".

END OF SECTION 28 31 00

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SECTION 31 11 00
CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 Description
A. This specification shall govern all work required for the clearing and grubbing as required to complete the project.

1.02 Related Sections
A. 31 22 13.10 SITE GRADING

1.03 Definitions *The words defined in this section shall for the purpose of the specifications have the meanings ascribed to them*
A. Clearing and Grubbing – the clearing, grubbing, and stripping of objectionable matter including the removing and disposing of trees, stumps, brush, roots, vegetation, rubbish and other objectionable matter from the project site by mechanical means.

PART 2 - PRODUCTS [NOT USED]

PART 3 - EXECUTION

3.01 General
A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that one requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.
B. The site shall be cleared of all trees, stumps, brush, roots, vegetation, rubble and other objectionable matter as indicated on Drawings, or as directed by the Owner.
C. Trees, Tree Stumps and Tree Roots
   1. Within Right-of-Way
      a. Area bounded by the lines two-feet (2’) behind back of curbs
         1) Shall be removed to a minimum depth of two-feet (2’) below bottom of proposed road subgrade elevation.
      b. Area bounded by the lines two-feet (2’) behind back of curbs to Right-of Way line
         1) Shall be removed to a minimum depth of two-feet (2’) below proposed finished grade or below natural grade, whichever is lower.
   2. Beyond Right-of-Way
      a. Shall be removed to a minimum depth of two-feet (2’) below proposed finished grade or below natural grade, whichever is lower.
D. Vegetation, Humus, and Objectionable Matter
   1. Areas which underlie compacted backfill shall be stripped of all vegetation, humus and other objectionable matter encountered within the top six-inches (6") of the soil.
      a. This material, with the exception of objectionable matter, shall be stockpiled, if feasible, and reused as surface stabilization material.
   2. Objectionable matter shall be determined by the Owner and shall become the property of the Contractor and disposed of in accordance with Local, State, and Federal regulations, unless otherwise instructed by the Owner.
E. Holes remaining after removal of materials shall be backfilled in accordance with Section 31 22 13.10 SITE GRADING.

3.02 Disposal of Materials
A. Onsite
   1. The material shall be disposed of at a disposal site as indicated on the Drawings or as directed by the Owner.

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2. The Contractor is responsible for the disposal of materials in accordance with all applicable Local, State, and Federal regulations.

B. Offsite
1. The material shall be disposed of at a disposal site obtained by the Contractor.
2. All material removed from site under this operation shall become the property of the Contractor's and therefore the Contractor's responsibility for proper disposal.
3. The Contractor is responsible for the disposal of materials in accordance with all applicable Local, State, and Federal regulations.

3.03 Protection

A. Existing Utilities
1. All existing utilities shall be identified and protected by the Contractor.
2. Damage to utilities shall be repaired by the Contractor at his sole expense as directed by the utility owner.

B. Trees, Vegetation, Landscaping, and Other Features
1. That are designated to be preserved shall be protected by the Contractor.
2. Damage shall be repaired by the Contractor at his sole expense as directed by the Owner of the item.
3. Do not park equipment, service equipment, store materials, or disturb the root area under the branches of trees designated for preservation.

C. Benchmarks, monuments, and existing structures designated to remain shall be protected.
1. Damage shall be repaired by the Contractor at his sole expense as directed by the Owner of the item.

3.04 Hazardous Materials

A. If the Contractor encounters hazardous substances, industrial waste, other environmental pollutants, underground storage tanks, or conditions conducive to environmental damage, the Contractor shall immediately stop work in the area affected and report the condition to the Owner's representative in writing.

B. Contractor shall not be responsible for or required to conduct any investigation, site monitoring, containment, cleanup, removal, restoration or other remedial work of any kind or nature (the "remedial work") under any applicable level, State or Federal law, regulation or ordinance, or any judicial order.

C. If the Contractor agrees in writing to commence and/or prosecute some or all of the remedial work, all costs and expenses, to include any extension of the contract time, of such remedial work shall be paid by the Owner to Contractor as additional compensation.

3.05 Archeological

A. In the event that archeological material is encountered during clearing and grubbing activities, the Contractor shall notify the Owner immediately and cease all work until notified by the Owner.
1. The Contract Time may be adjusted if the work on the project is delayed.

3.06 Contamination

A. In the event that contaminated material is encountered during clearing and grubbing activities, the Contractor shall notify the Owner immediately and cease all work in the contaminated area until notified by the Owner.
1. The Contract Time may be adjusted if the work on the project is delayed.

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SECTION 31 22 13.10
SITE GRADING

PART 1 - GENERAL
1.01 Description
A. This specification shall govern all work required for site grading as required to complete the project.
1.02 Related Sections
A. 31 11 00 CLEARING AND GRUBBING
1.03 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related Sections.
1.04 Definitions *The words defined in this section shall for the purpose of this specification have the meanings ascribed to them.*
A. Site Grading – all areas beyond the right-of-way of roadways and access ways

PART 2 - PRODUCTS
2.01 Fill
A. Shall be of similar material as to the natural occurring material onsite and approved by the Owner.
B. Shall be uniform as to material, density, and moisture content.
C. Shall be free of large clods, large rocks, organic matter, and other objectionable material.
D. In all cases material shall be free of construction materials (concrete rubble, pipe, fiberglass, asphalt material, metal, etc.) and trash material.

PART 3 - EXECUTION
3.01 General
A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that one requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.
3.02 Site Preparation
A. Prior to site grading the site shall be cleared in accordance with Section 31 11 00 CLEARING AND GRUBBING.
B. Unless specified otherwise on Drawings, the existing surface shall be loosened by scarifying or plowing to a depth of not less than six-inches (6”).
C. The loosened material shall be re-compacted with any fill material required for the project.
3.03 Placement and Compaction
A. No fill that is placed by dumping in a pile or windrow, shall be incorporated into a layer in that position; all such piles and windrows shall be moved by blading or similar method.
B. All fill shall be placed in layers approximately parallel to the finish grade and in layers not in excess of six-inches (6”) of un-compacted depth, unless indicated otherwise on Drawings.
C. The fill shall be compacted to a density which approximates that of the existing natural ground unless indicated otherwise on Drawings.
D. The Owner may order test rolling to evaluate the uniformity of compaction.
E. All irregularities, depressions, and soft spots which develop shall be corrected by the Contractor.
3.04 Excess Material

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A. Excess material from excavation that is not incorporated into the site as fill shall become the property of the Contractor, unless indicated otherwise on the Drawings.
B. The Contractor is responsible for disposal of the excess material away from the project in accordance with local, state, and federal regulations, unless indicated otherwise on the Drawings.

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SECTION 31 22 16.13
ROADWAY SUBGRADE SHAPING

PART 1 - GENERAL

1.01 Description
A. This specification shall govern all work required for roadway subgrade shaping as required to complete the project.

1.02 Related Sections
A. 31 11 00 CLEARING AND GRUBBING

1.03 References *The latest edition of the referenced item below shall be used and obtained by the Contractor*
A. ASTM D 698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))

PART 2 - PRODUCTS [NOT USED]

PART 3 - EXECUTION

3.01 General
A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.
B. Prior to performing subgrade or base course work all utilities under pavement shall be inspected and tested prior to placement.
   1. The Contractor may proceed at his/her own risk, knowing that any repairs required to utilities that requires the removal and replacement of the subgrade, base, and/or pavement surface in accordance with relevant specification will be completed at the Contractors sole expense.

3.02 Stripping and Excavation
A. The site shall be cleared and grubbed in accordance with Section 31 11 00 CLEARING AND GRUBBING.
B. Unless otherwise noted, remove existing trees, shrubs, fences, curb, gutter, sidewalk, drives, paving, pipe and structures within the graded area which interfere with new construction of finished grading.
C. All suitable excavated materials shall be utilized, insofar as practicable, in constructing the required roadway sections or in uniformly widening embankments, flattening slopes, etc., as directed by the Owner.
D. Unwanted roadway excavation and roadway excavation in excess of that needed for construction shall become the property of the Contractor to be disposed of by him outside the limits of the right-of-way at a location suitable to the Owner.
E. "Unsuitable" material encountered below subgrade elevation in roadway cuts, when declared unwanted by the Owner, shall be replaced as directed by the Owner with material from the roadway excavation or with other suitable material.
F. Maintain moisture and density until covered by the subbase or base.
G. Remove soft or wet areas found at any time, replace with suitable material, and recompact (esp. utility trenches).

3.03 Subgrade Preparation
A. That area shown on the Drawings for roadway construction shall be cut to grade as indicated on the Drawings.
B. Irregularities exceeding two-inches (2") in sixteen-feet (16') shall be corrected.

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C. Soft areas found at anytime shall be removed, replaced with acceptable material and compacted (esp. at utility trenches).
D. The correct moisture density relationship shall be maintained.

3.04 Matching Grades at Right-of-Way Line

A. Finished grade at the property line shall be as shown on the Drawings.
B. The Owner may require a reasonable amount of filling on private property where the sidewalk grade is above the property elevation with permission from property owner.
C. Use suitable material from the excavation.
D. Unless otherwise directed, cuts at right-of-way lines shall be made at a maximum slope of 3:1.

3.05 Drainage

A. During construction, the roadbed and ditches shall be maintained in such condition as to insure proper drainage at all times, and ditches and channels shall be so constructed and maintained as to avoid damage to the roadway section.
B. All slopes that, in the judgment of the Owner, require variation shall be accurately shaped, and care shall be taken that no material is loosened below the required slopes.
C. All breakage and slides shall be removed and disposed of as directed.

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SECTION 31 22 16.23
CHANNEL SHAPING

PART 1 - GENERAL
1.01 Description
A. This specification shall govern all work required for channel shaping as required to complete the project.
1.02 Related Sections
A. 31 22 13.10 SITE GRADING
B. 31 24 13.10 EMBANKMENTS
1.03 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related Sections.

PART 2 - PRODUCTS
2.01 General
A. Where shown on the Drawings, selected materials shall be utilized in the formation channels, in which case the work shall be performed in such manner and sequence that suitable materials may be selected, removed separately and deposited within limits and at elevations required.
B. Material for fill shall be shall be in accordance with Section 31 22 13.10 SITE GRADING or Section 31 24 13.10 EMBANKMENTS

PART 3 - EXECUTION
3.01 General Information
A. Excavated slopes shall be finished in conformance with the lines and grades indicated on the Drawings.
B. When completed, the average plane of slopes shall conform to the slopes indicated on the Drawings and no point on completed slopes shall vary from the designated slopes by more than 0.5 foot measured at right angles to the slope, unless otherwise specified.
C. In no case shall any portion of the slope encroach on the roadbed.
D. The tops of excavated slopes and the end of excavation shall be rounded as shown on the Drawings.
E. All suitable materials removed from the excavation shall be used, insofar as practicable, in the formation of embankments in accordance with the specification, Section 31 24 13.10 EMBANKMENTS, or shall be otherwise utilized or satisfactorily disposed of as indicated on Drawings, or as directed, and completed work shall conform to the established alignment, grades and cross sections.
F. During construction, the channel shall be kept drained, insofar as practicable, and the work shall be prosecuted in a neat workmanlike manner.
G. Unwanted channel excavation in excess of that needed for construction shall become the property of the Contractor and removed from the site and properly disposed of in accordance with Local, State, and Federal regulations.

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SECTION 31 23 16.13
TRENCHING

PART 1 - GENERAL

1.01 Description

A. This specification shall govern all work required for trenching as required to complete the project.

1.02 References *The latest edition of the referenced item(s) below shall be used and obtained by the Contractor*

A. Part 1926, Subpart P – Excavations, Trenching, and Shoring of the Occupational Safety and Health Administration (OSHA) Standards and Interpretations
B. Texas Code Chapter 756 Subchapter C – Trench Safety

1.03 Submittals

A. Submit a Trench Safety Program specifically for the construction of trench excavation and designed in accordance with Local, State, and Federal standards and regulations for trench safety laws.
   1. *Notice: Review of the safety program by the Owner will only be in regard to compliance with this specification and will not constitute, in any form, approval by the Owner nor relieve the Contractor of any obligations under Local, State, or Federal trench safety regulations.*
B. Construction and shop drawings containing deviations from local, state, and federal standards and regulations or special designs shall be sealed by a Registered Professional Engineer of the State of Texas and retained and paid by the Contractor.

1.04 Definitions *The words defined in this section shall for the purpose of this specification have the meanings ascribed to them.*

A. A trench shall be defined as a narrow excavation (in relation to its depth) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than fifteen feet (15').
B. Trenches as used herein, shall apply to any excavation in which structures, utilities, or other items as a result of construction are placed or removed regardless of depth.
C. Trench Safety Program as used herein, shall be a written and detailed plan that is developed by the Contractor with all methods and products used to provide for worker safety in excavation and trenching operations required during the project and includes all information required an in accordance with Local, State (Texas Code Chapter 756 Subchapter C – Trench Safety, but not limited to), and Federal (Part 1926, Subpart P – Excavations, Trenching, and Shoring of the Occupational Safety and Health Administration (OSHA) Standards and Interpretations, but not limited to) standards and regulations.
D. The Trench Safety System shall include, but are not limited to, sloping, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, shoring, dewatering or diversion of water to provide adequate drainage.

1.05 Indemnification

A. The Contractor shall indemnify and hold harmless the Owner, its employees and agents, from any and all damages, costs (including, without limitation, legal fees, court costs, and the cost of investigation), judgments or claims by anyone for injury or death of person(s) resulting from the collapse or failure of trenches constructed under this Contract.
B. The Contractor acknowledges and agrees that this indemnity provision provides indemnity for the Owner, its employees and agents, in case the Owner, or its employees or agents, is negligent either by act or omission in providing for trench safety, including, but not limited to safety program and design reviews, inspections, failures to issue stop work orders, and the hiring of the Contractor.
C. Review of the safety program by the Owner will only be in regard to compliance with this

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specification and will not constitute approval by the Owner nor relieve the Contractor of any obligations under Local, State, or Federal regulations.

PART 2 - PRODUCTS

2.01 All products shall be in accordance with the Trench Safety Program.

PART 3 - EXECUTION

3.01 General Information

A. Worker Safety in excavations and trenches shall be provided by the Contractor in accordance with Occupational Safety and Health Administration (OSHA) Standards, 29 CFR, in accordance with Local and State regulations, and industry standards.

B. It is the sole responsibility of the Contractor, and not the Owner, to determine and monitor the specific applicability of a safety system to the field conditions to be encountered on the job site during the project.

3.02 Installation

A. Install and maintain the trench safety system in accordance with the Trench Safety Program and all Local, State, and Federal provisions.

B. Install specially designed trench safety systems in accordance with the Contractors trench excavation safety program for the locations and conditions identified in the program.

C. A competent person, as identified in the Contractors Trench Safety Program, shall verify that trench safety equipment are certified for the actual installation conditions.

3.03 Inspection

A. The Contractor or Contractors independently retained consultant, shall make daily inspections of the trench safety system(s) to ensure that the installed system(s) and operations meet the requirements of the Trench Safety Program, and Local, State, and Federal regulations.

B. If evidence of possible cave-ins, slides, or trench safety system failure is apparent, the Contractor shall immediately stop work in and around the trench and move all personnel and individuals to a safe location until the necessary precautions have been taken by the Contractor to safeguard personnel entering the trench.

C. The Contractor must maintain a permanent record of daily inspections on site.

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SECTION 31 24 13.10
EMBANKMENT

PART 1 - GENERAL
1.01 Description
A. This specification shall govern all work required for the furnishing, placing, and compacting materials for the construction of roadways, embankments, levees, dikes, or any designated section of the roadway where additional material is needed as required to complete the project.

1.02 Related Sections
A. 31 11 00 CLEARING AND GRUBBING

1.03 References *The latest edition of the referenced item below shall be used.*
A. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 107 “Embankment”
B. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 204 “Sprinkling”
C. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 210 “Rolling”
D. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 216 “Proof Rolling”
E. Texas Department of Transportation (TxDOT) Test Procedure TEX-104-E
F. Texas Department of Transportation (TxDOT) Test Procedure TEX-106-E
G. Texas Department of Transportation (TxDOT) Test Procedure TEX-107-E
H. Texas Department of Transportation (TxDOT) Test Procedure TEX-115-E

1.04 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related Section(s).

PART 2 - PRODUCTS
2.01 General
A. In addition to the requirement in the excavation items of the specifications covering the general selection and utilization of materials to improve the roadbed, embankments shall be constructed in proper sequence to receive the select material layers shown on the Drawings, with such modifications as may be directed by the Owner.
B. The layer of embankment immediately preceding the upper layer of select material shall be constructed to the proper section and grade within a tolerance of not more than one-tenth of a foot (0.10’) from the established section and grade when properly compacted and finished to receive the select material layer.

2.02 Materials
A. Shall be approved on-site material capable of forming a stable embankment.
B. Material shall be from on-site excavation free from vegetation or other objectionable material unless otherwise indicated on the Drawings.
C. Offsite Material
   1. When offsite material is to be used, the Contractor must comply with all local, state, and federal laws, ordinances, and regulations.
   2. The Contractor must demonstrate and satisfy to the Owner that all permits, contracts, and legal documentation are in place prior to obtaining the material.
   3. Prior to obtaining materials from offsite the Contractor shall provide all required material tests to analyze the material to insure compliance with specifications.

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a. When on-site excavation material is to be used and additional material from off-site is to be incorporated the materials shall be similar in properties.

D. Water
1. Shall be free of objectionable materials.

PART 3 - EXECUTION

3.01 General Information

A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
1. In the event that one requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.

B. Prior to placing embankment the area to be covered shall be stripped of all vegetation in accordance with Section 31 11 00 CLEARING AND GRUBBING.

C. Equipment shall be applicable to conduct the work as described in this specification or as specified on the Drawings.

D. Washes, gulleys, wet areas, and yielding areas shall be corrected as directed by the Owner.

E. Trees, stumps, roots, vegetation or other unsuitable materials shall not be placed in embankment.

F. Unless otherwise indicated on Drawings the surface of the ground which is to receive embankment shall be loosened by scarifying or plowing to depth of not less than six-inches (6”).
1. The loosened material shall be re-compacted with the new embankment as hereinafter specified.

G. Each layer of embankment shall be uniform as to material, density and moisture content before beginning compaction.

3.02 Placement

A. Embankment shall be placed in layers not to exceed six-inch (6”) un-compacted depth and the full width of the embankment, unless otherwise noted.
1. Where embankment is adjacent to a hillside or old roadbed, the existing slope shall be cut in steps to not less than the vertical depth of an un-compacted layer of six-inches (6").

B. The fill material shall be placed from the low side and compacted.

C. Each layer shall overlap the existing embankment by at least the width indicated by the embankment slope.

D. Where layers of unlike materials are adjacent to each other, each layer shall be featheredged for at least 100 feet or the material shall be so mixed as to prevent abrupt changes in the soil.

E. No material placed in the embankment by dumping in a pile or windrow shall be incorporated in a layer in that position, but all such piles or windrows shall be moved by blading or similar methods.

F. Clods or lumps of material shall be broken and the embankment material mixed by blading, harrowing, disking or similar methods to the end that a uniform material of uniform density is secured in each layer.

G. Except as otherwise required by the Drawings, all embankments shall be constructed in layers approximately parallel to the finished grade and each layer shall be so constructed as to provide a uniform slope of quarter-inch (1/4”) per foot from the centerline of the embankment to the outside.

3.03 Compaction

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A. Each layer shall be compacted to the required density by rolling in accordance with TxDOT Item 210.
B. Prior to and in conjunction with the rolling operation, each layer shall be brought to the moisture content necessary in accordance with TxDOT Item 204 to obtain the required density
C. Prior to and in conjunction with the rolling operation, each layer shall be kept leveled with suitable equipment to insure uniform compaction over the entire layer.
D. Rolling shall be longitudinally, begin at the sides, and proceed toward the center, overlapping on successive trips by at least 1/2 the width of the roller.
E. All irregularities, depressions, weak or soft spots which develop shall be corrected immediately by the Contractor.

3.04 Density Control

A. Laboratory Tests shall determine the maximum dry density (D_a) and optimum moisture content (W_{opt}) by means of TxDOT TEX-114-E
B. Field density determinations will be made in accordance with TxDOT TEX-115-E and on Table 2:

Table 2
Field Density Control Requirements

Description	Density	Moisture Content
	TEX-115-E	
PI ≤ 15	≥ 98% D_a	
15 < PI ≤ 35	≥ 98% D_a and ≤ 102% D_a	≥ W_{opt}
PI > 35	≥ 95% D_a and ≤ 100% D_a	≥ W_{opt}

C. After each layer of earth embankment or select material is complete, testing as required by the Owner will be made by the Contractor.
D. If the material fails to meet the density specified, the course shall be reworked as necessary to obtain the specified compaction, and the compaction method shall be altered on subsequent work to obtain specified density.
E. Such procedure shall be determined by, and subject to, the approval of the Owner.
F. The Owner may order proof rolling to test the uniformity of compaction of the embankment layers.
   1. Proof Rolling shall be in accordance with TxDOT Item 216

3.05 Maintenance of Moisture and Reworking

A. Should the subgrade, due to any reason or cause, lose the required stability, density or moisture, before the pavement structure is placed, it shall be re-compacted and refinished at the sole expense of the Contractor.
B. Excessive loss of moisture in the subgrade shall be prevented by sprinkling, sealing or covering with a subsequent layer or granular material.
C. Excessive loss of moisture shall be construed to exist when the subgrade soil moisture content is more than two-percent (2%) below the optimum.

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SECTION 31 31 16 – TERMITE CONTROL

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

SUBMITTALS

A. Provide manufacture's technical data and application instructions.

B. Submit manufacture's certification that products are in compliance with current environmental protection statutes.

PRODUCTS

A. Termiticide: Provide an EPA-Registered termiticide, complying with requirments of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termititcide concentration allowed for each specific use, according to product's EPA-Registered Label.

B. Acceptable Termicides:

1. BASF Corporation, Agricultural Products; Termidor.
2. Bayer Environmental Science; Premise.
3. FMC Agricultural Solutions; Talstar TI.
4. Syngenta; Demon Max.

C. Dilute with water to concentrate level recommended by manufacturer.

D. Other solutions may be used as recommended by the Contractor if approved for intended application by local authorities having jurisdiction. Use only soil treatment solutions that are not harmful to plants.

EXECUTION

A. Examine the following:

1. Verify that soil surfaces are sufficiently dry to absorb toxicant, and ready to receive treatment.
2. Verify that the area is well ventilated.
3. Verify that anticipated weather conditions comply with label recommendations prior to application.
4. Commencement of operations indicates acceptance of conditions.

B. Remove all wood and cellulose-containing material from around foundation beams or slabs. Eliminate termite access to moisture.

C. Solution Application:

1. Apply soil treatment solution according to current EPA regulations.
2. Add chemically inert coloring agent to solution to indicate which areas have received treatment.
3. Apply solution as overall treatment under interior slab (both suspended structural floors and slabs on grade) and attached slab or walks areas.
4. Apply to inside of foundation walls and areaways and around plumbing penetrations.

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5. Apply solution along outside edge of building, 3 inches above grade prior to backfilling around foundation.
6. Allow minimum 12 hours for drying after application, before beginning vapor barrier, reinforcing placement and other construction activities.
7. Post signs in areas of application with warning that soil treatment solution has been applied.
8. Reapply soil treatment solution to areas disturbed by subsequent excavation and other construction activities following application.
9. Inspect and reapply treatment solution if necessary after heavy rainfalls subsequent to initial application.

WARRANTY

A. Upon completion of initial application provide to the Owner the option of purchasing an annual inspection and treatment contract as well as a warranty against termite damage.

B. Owner shall reserve the right to purchase or reject the annual inspection and treatment contract as well as the damage warranty at his sole discretion.

END OF SECTION 31 31 16

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SECTION 32 11 00
SUBGRADE AND BASE COURSE

PART 1 - GENERAL
1.01 Description
A. This specification shall govern work required, but not limited to, the furnishing and placement of subgrade and base course(s) as required to complete the project.
1.02 Related Sections
A. 32 11 13.13 LIME TREATED SUBGRADE
B. 32 11 13.26 CEMENT TREATED SUBGRADE
C. 32 11 23.23 FLEXIBLE BASE COURSE
1.03 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related specification(s).
B. Substitution of Base Course:
   1. Product substitution submittal shall be in writing and submitted fourteen (14) working days prior to commencing construction of the base course and contain the following information:
      a. Product information conforming the requirements of the related Section,
      b. Design of Substituted Base Course indicating equivalence to the Base Course as indicated on the Drawings,
      c. Indicating other Bid Items affected by such a proposed substitution.

PART 2 - PRODUCTS
2.01 Subgrade
A. Shall be as indicated on the Drawings.
   1. If no Subgrade Treatment is indicated in the Drawings the treatment shall be as follows:
      a. Sand Material
         1) Shall be as indicated on the Drawings.
            a) If not indicated on the Drawings, shall be Cement treated in accordance with Section 32 11 13.26 CEMENT TREATED SUBGRADE, unless otherwise indicated by the Owner.
      b. Other
         1) Shall be as indicated on the Drawings.
            a) If not indicated on the Drawings, shall be Lime treated in accordance with Section 32 11 13.13 LIME TREATED SUBGRADE, unless otherwise indicated by the Owner.
2.02 Base Course
A. Shall be as indicated on the Drawings
   1. Aggregate Base Course
      a. Shall be in accordance with Section 32 11 23.13 FLEXIBLE BASE COURSE

PART 3 - EXECUTION
3.01 General
A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.

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B. Prior to performing subgrade or base course work all utilities under pavement shall be inspected and tested prior to placement.
   1. The Contractor may proceed at his/her own risk, knowing that any repairs required to utilities that requires the removal and replacement of the subgrade, base, and/or pavement surface in accordance with relevant specification will be completed at the Contractors sole expense.

3.02 Subgrade Treatment

A. Shall be as indicated on the Drawings and in accordance with the applicable specification for the product required.

3.03 Base Course

A. Shall be as indicated on the Drawings and in accordance with the applicable specification for the product required.

3.04 Substitution of Drawing Indicated Subgrade and/or Base Course Material

A. General
   1. Substitution of Subgrade and/or Base Course materials, other than as indicated in the Drawings and Specifications is allowed subject to:
      a. A combination of strength and thickness that is equivalent to the Subgrade and/or Base Course strength and thickness as indicated in the Drawings and Specifications,
      b. Lines and Grades of the roadway surface must be maintained as indicated on the Drawings, including allowances for utilities,
      c. Owner and Engineer approval.
   2. The Contractor may request the Subgrade and/or Base Course product to be substituted in accordance with Part 1 Section 1.03 of this specification.

B. Effects of Substitution
   1. Proposed Utilities and Existing Utilities
      a. If the Subgrade and/or Base Course product being substituted changes the depth required for the Subgrade and/or Base Course and as a result the horizontal and/or vertical location of utilities, as indicated on the Drawings, or determined in the field, are required to be adjusted, then:
         1) The Contractor will be solely responsible for all costs associated with the changes including but not limited to; Designing, Drawing adjustments, Drawing reproduction, Specifications, Contract, Approvals, and incidentals, and,
   2. Lines and Grades
      a. Roadway
         1) If the Subgrade and/or Base Course product being substituted changes the depth required for the Subgrade and/or Base Course it is not to affect the lines and grades of the roadway and shall be maintained as indicated on the Drawings.
      b. Excavation
         1) If the substituted Subgrade and/or Base Course product changes the depth required for the Subgrade and/or Base Course and in turn affects the quantities of existing materials to be excavated and/or filled, it shall be the sole responsibility of the Contractor to determine and to ensure that the project can be completed as per the Contract and in accordance with the Lines and Grades as shown on the Drawings. The Contractor will be solely responsible for all costs associated with the changes including but not limited to: Additional labor, materials, equipment, maintenance, disposal, and all incidental expenses required to perform the changes.

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SECTION 32 11 13.13
LIME TREATED SUBGRADE

PART 1 - GENERAL

1.01 Description

A. This specification shall govern work required for the furnishing, mixing, compacting of Lime Treated Subgrade as required to complete the project.

1.02 References *The latest edition of the referenced item below shall be used.*

A. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 204 “Sprinkling”
B. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 210 “Rolling”
C. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 260 “Lie Treatment (Road-Mixed)
D. Texas Department of Transportation (TxDOT) Test Procedure Tex-101-E Preparing Soil and Flexible Base Materials for Testing
E. Texas Department of Transportation (TxDOT) Test Procedure Tex-103-E Determining Moisture Content in Soil Materials
F. Texas Department of Transportation (TxDOT) Test Procedure Tex-115-E Field Method for Determining In-Place Density of Soils and Base Materials
G. Texas Department of Transportation (TxDOT) Test Procedure Tex-121-E Soil-Lime Testing
H. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS-6350, Lime and Lime Slurry

1.03 Submittals

A. Product Information
    1. Clearly indicate within submittal that the product is in compliance with this and related specification(s).
B. Test reports shall be as follows unless noted otherwise:
    1. Submit within three (3) working days after the test is completed to the following:
        a. Owner,
        b. As directed by the Owner.
    2. All test reports shall clearly indicate the following information:
        a. Location of area tested by the following,
            1) Station,
            2) Distance from Center Line,
            3) Travel lane,
            4) Or as otherwise specified
        b. Date,
        c. Company whom performed test,
        d. Person by who performed test by one of the following:
            1) Name,
            2) Initials,
            3) Employee identification number,
        e. Material tested,
        f. Test used,
        g. Test values obtained,
        h. Indicate Pass or Fail in accordance with the Specification(s) and Drawing(s) requirements,
        i. Person with the testing company who has reviewed and approves the test results by all of the following:

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1) Printed name
2) Signature
3) License number

PART 2 - PRODUCTS

2.01 Soil

A. Soil shall consist of Owner approved material, free from vegetation or other objectionable matter, encountered in the roadbed section and other acceptable material used in the preparation of the roadbed in accordance with this specification.

2.02 Lime

A. In accordance with TxDOT Item 260.

2.03 Water

A. Water shall be free from deleterious contaminants and other objectionable materials.
B. Source of water shall be approved by the Owner.

PART 3 - EXECUTION

3.01 General

A. It is the primary requirement of this specification to secure a completed course of treated material containing a uniform lime treated mixture, free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth and with a smooth surface suitable for placing subsequent courses.
B. It shall be the responsibility of the Contractor to regulate the sequence of his work, to use the proper amount of lime, maintain the work and rework the courses as necessary to meet the requirements.
C. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
    1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.

3.02 Equipment

A. General
    1. The machinery, tools and equipment necessary for proper execution of the work shall be on the project and approved by the Owner prior to the beginning of construction operations.
    2. All machinery, tools, and equipment used shall be maintained in a satisfactory and workmanlike manner.
    3. The Contractor shall at all times provide sufficient equipment to enable continuous execution of the work and its completion in the required number of working days.
    4. The equipment provided by the Contractor shall be operated by experienced and capable workmen and shall be that necessary to provide a cement treatment meeting the requirements herein specified.
B. Transportation Equipment
    1. Shall be capable of hauling the material in a method recognized by the industry as being satisfactory for the material being transported.
    2. Shall be of type recommended by manufacturer of product(s).
    3. Equipment shall be in compliance with local, state, and federal laws and regulations.
C. Rollers
    1. Shall be in accordance with TxDOT Item 210.
D. Storage Facility

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1. Material shall be stored and handled in closed weatherproof containers until immediately before distribution.
2. If storage bins are used, they shall be completely enclosed.
3. Material in bags shall be stored in weatherproof buildings with adequate protection from ground dampness.

E. Lime Slurry Equipment
1. Slurry tanks shall be equipped with agitation devices to slurry lime on the project or other approved location.

F. Pulverization Equipment
1. Provide pulverization equipment that:
a. Cuts and pulverizes material uniformly to the proper depth with cutters that will plane to a uniform surface over the entire width of the cut.
b. Provides a visible indication of the depth of cut at all times.
c. Uniformly mixes the materials.

3.03 Material Transportation

A. General
1. All material shall be transported in accordance with local, state, and federal regulations.

B. Truck
1. Each truck shall have the weight of lime determined on certified scales.
2. All exit ports are to be sealed at the plant.

C. Bags
1. Each bag shall bear the manufacturer's certified weight.
2. Bags varying more than five-percent (5%) from that weight may be rejected and the average weight of bags in any shipment, as shown by weighing ten-percent (10%), with a minimum of five (5), of the bags taken at random from each pallet, shall not be less than the manufacturer's certified weight.

3.04 Preparation of Roadbed

A. General
1. Before other construction operations are commenced, the roadbed shall be graded and shaped as required to construct the lime treatment for material in place in conformance with the lines, grades, thickness and typical cross section shown on the Drawings.
2. Unsuitable soil or material shall be removed and replaced with acceptable soil.
3. The subgrade shall be firm and able to support without displacing the construction equipment and the compaction hereinafter specified.
4. Soft or yielding subgrade shall be corrected and made stable before construction proceeds.

B. Pulverization
1. The soil shall be pulverized so that 100% of the material passes the two and one-half-inch (2-1/2”) sieve when tested from the roadway in the roadway condition by TxDOT Tex-101-E.

3.05 Placement

A. General
1. It is the primary requirement of this specification to secure a completed course of treated material containing a uniform lime mixture, free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth and with a smooth surface suitable for placing subsequent courses.
2. It shall be the responsibility of the Contractor to regulate the sequence of his work, to use the proper amount of lime, maintain the work and rework the courses as necessary to meet the requirements.

B. Application
1. General

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a. Lime shall be spread only on that area where the first mixing operations can be completed during the same working day.
b. Lime amount to be used is to be determined by the Contractor and approved by the Owner, if not on the Drawings.
    1) Any rates indicated on the Drawings are the result of preliminary tests and shall be verified.
    2) Application rate may be varied by the Owner, if conditions warrant.
c. Unless otherwise approved by the Owner, the lime operation shall not be started when the air temperature is below 40º F and falling, but may be started when the air temperature is above 35º F and rising.
    1) The temperature will be taken in the shade and away from artificial heat.
    2) Lime shall not be placed when weather conditions in the opinion of the Owner are unsuitable.

C. Method
1. General
    a. Unless otherwise shown on the Drawings, lime shall be applied at a rate in pounds of dry lime per square yards, in the form of a slurry.
2. Slurry Method
    a. The Lime shall be mixed with water to form a slurry with a solids content approved by the Owner.
        1) Commercial Lime Slurry shall be delivered to the project in slurry form at or above the minimum dry solids content approved by the Owner.
        2) The distribution of lime at the rate(s) required shall be attained by successive passes over a measured section of roadway until the proper lime content has been secured.
3. Dry Method
    a. Dry placing is not allowed unless approved by the Owner and:
        1) The lime is distributed by an approved spreader at the specified rate or as directed by the Owner.
        2) The lime is distributed at a uniform rate and in such a manner as to reduce the scattering of lime by the wind.
    b. The material shall be sprinkled as approved by the Owner.
    c. The distribution of lime at the rate(s) required shall be attained by successive passes over a measured section of roadway until the proper lime content has been secured.
    d. Lime shall be applied to the roadway and water and mixing shall commence to permit uniform and intimate mixture of soil and cement and it shall not exceed the specified optimum moisture content for the soil-lime mixture.

3.06 Delivery Certification

A. Certification of lime quantity and quality shall be provided as required to monitor the application.
B. Certification should be in the form of weight tickets which indicate the actual weight of dry hydrated lime.

3.07 Mixing

A. General
1. Mixing shall begin within six (6) hours of lime application.
2. During the interval of time between applications and mixing, hydrated lime that has been exposed to the open air for a period of six (6) hours or more or to excessive loss due to washing or blowing will not be accepted for payment.

B. Initial Mixing
1. The material and lime shall be thoroughly mixed by approved road mixers or other approved equipment, and the mixing continued until, in the opinion of the Owner, a

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homogeneous, friable mixture of material and lime is obtained, free from all clods or lumps.

2. Materials containing plastic clays or other material which will not readily mix with lime shall be mixed as thoroughly as possible at the time of the lime application, brought to the proper moisture content and left to cure one (1) to four (4) days as directed by the Owner.
3. During the curing period, the material shall be kept moist as directed.

C. Final Mixing
1. After the required curing time, the material shall be uniformly mixed by approved methods.
2. If the soil binder-lime mixture contains clods, they shall be reduced in size by raking, blading, planning, harrowing, scarifying or the use of other approved pulverization methods so that, when all nonslaking aggregates retained on the 3/4" sieve are removed, the remainder of the material shall meet the following requirements in Table 1 when tested in accordance with TxDOT Tex-101-E, Part III:

Table 1
Gradation Requirements

Sieve Size	Minimum Percent (%) Passing
1-3/4"	100
3/4"	85
#4	60

3.08 Compaction

A. General
1. Prior to the beginning of compaction, the mixture shall be in a loose condition for its full depth.
2. Compaction of the mixture shall begin immediately after final mixing and in no case later than twenty-four (24) hours after final mixing.
3. Compaction shall continue until the entire depth of mixture is uniformly compacted as hereinafter specified.
4. Bring each layer to the moisture content required.
   a. At the start of compaction, the percentage of moisture in the mixture and in unpulverized soil lumps, based on over-dry weights, shall not be below or more than two (2) percentage points above the specified optimum moisture content and shall be less than that quantity which will cause the soil-lime mixture to become unstable during compaction and finishing.
   b. When necessary, sprinkle the material in accordance with TxDOT Item 204.
5. Begin rolling longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least one-half (1/2) the width of the roller unit.
6. On superelevated curves, begin rolling at the low side and progress toward the high side.
7. Offset alternate trips of the roller.
8. Operate rollers at a speed between 2 and 6 MPH, or as directed.
9. When the uncompacted soil-lime mixture is wetted by rain so that the average moisture content exceeds the tolerance given at the time of final compaction, the entire section shall be reconstructed in accordance with this specification at the sole expense of the Contractor.
10. Rework, recompact, and refinish material that fails to meet or that loses required moisture, density, stability, or finish before the next course is placed or the project is accepted.

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11. Continue work until specification requirements are met.
12. Use mechanical tamps in areas inaccessible to rollers.
13. If the total thickness of the material to be treated cannot be mixed in one (1) operation, the previously mixed material shall be bladed to a windrow just beyond the area to be treated and the next layer mixed with lime as previously specified.
    a. The first layer of the material shall be compacted in such a manner that the treated material will not be mixed with the underlying material.
14. In addition to the requirements specified for density, the full depth of the material shown on the Drawings shall be compacted to the extent necessary to remain firm and stable under construction equipment.
15. Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface, upon completion, shall be smooth and in conformity with the typical section shown on the Drawings and to the established lines and grades.
16. After each section is completed, tests as required by the Owner will be made by the Contractor.

B. Density Control
1. All testing to ensure density requirements shall be completed by a testing facility that is capable of performing all the required tests and is approved by the Owner.
2. Determine the moisture content in the mixture at the beginning of and during compaction in accordance with TxDOT Tex-103-E.
3. Compact to a minimum ninety-five percent (95%) of the maximum density determined in accordance with Tex-121-E, unless otherwise shown on the Drawings.
4. The Contractor shall determine roadway density at a frequency of one (1) test per one-hundred feet (100') per lane per lift staggered, of completed travel lane sections and under the curb and gutter, unless noted otherwise, or directed by Owner.
5. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements and retested.

C. Rework
1. General
    a. Rework, when required to meet pulverization requirements or density.
    b. Reworking shall include loosening, road mixing as approved by the Owner, compacting, and finishing.
    c. When a section is reworked, a new optimum moisture content in accordance with TxDOT Tex-103-E and density in accordance with Tex-121-E will be determined from the reworked material.
    d. Compact in accordance with Section 3.8 of this specification.
    e. Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface, upon completion, shall be smooth and in conformity with the typical section shown on the Drawings and to the established lines and grades.
2. Within seventy-two (72) hours of final compaction
    a. Shall be done until compaction is met.
3. Beyond seventy-two (72) hours of final compaction
    a. Shall include the addition of additional lime at ten-percent (10%) to fifteen-percent (15%) of the initial application rate or as deemed necessary by the Owner.

3.09 Finishing

A. General
1. Immediately after completing compaction the resulting surface shall be thoroughly rolled with a pneumatic tire roller and clipped, skinned, or tight bladed by a maintainer or subgrade trimmer to a depth of approximately quarter-inch (1/4").

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2. The surface shall then be thoroughly compacted with the pneumatic roller, adding small increments of moisture as needed during rolling until a smooth surface is attained.
3. If aggregate larger than No. 4 is present in the mixture; one (1) complete coverage of the section with the flat wheel roller shall be made immediately after the clipping operation.
4. When directed by the Owner, surface finishing methods may be varied from this procedure provided a dense, uniform surface, free of surface compaction planes, is produced.
5. The moisture content of the surface material must be maintained at its specified optimum during all finishing operations.
6. Surface compaction, rolling, blading and finishing shall proceed in such a manner as to produce a smooth, closely knit surface, free of cracks, ridges or loose material conforming to the crown, grade and line shown on the Drawings, within three (3) hours of initial mixing.
7. After the final layer or course of the treated material has been compacted, it shall be brought to the required lines and grades in accordance with the Drawings or as directed by the Owner.
8. Remove all loosened material from the surface of the section and dispose of it at an approved location.
9. Do not surface patch.

B. Finish grade of constructed subgrade in accordance with the following grade tolerances:
   1. Staged Construction
      a. Grade to within one-inch (1”) in the cross-section and one-inch (1”) in sixteen-feet (16’) measured longitudinally.
   2. Turnkey Construction
      a. Grade to within half-inch (1/2”) in the cross-section and half-inch (1/2”) in sixteen-feet (16’) measured longitudinally.

3.10 Curing

A. The completed section shall be moist cured or prevented from drying by addition of an asphalt material at the rate of 0.05 to 0.20 gallons per square yard.
B. Curing shall continue for two (2) to five (5) days before further courses are added or traffic is permitted, unless otherwise approved by the Owner.
C. However, the lime treated material may be covered by other courses, the day following finishing, when approved by the Owner.
D. When the Drawings provide for the treated material to be covered by other courses of material, the next course shall be applied within fourteen (14) calendar days after final compaction is completed, unless otherwise approved by the Owner.

3.11 Construction Joints

A. At the end of each day's construction, a straight transverse construction joint shall be formed by cutting back into the total width of completed work to form a true vertical face free of loose and shattered material.
B. For large and wide areas the subgrade shall be built in a series of parallel lanes of convenient length and width meeting and approval of the Owner.

3.12 Maintenance

A. The Contractor is required to maintain the subgrade in good condition until all work has been completed and accepted.
B. Maintenance shall include, but not limited to, the immediate remedy of any defects, maintaining moisture content, repairing damages due to construction and/or local traffic.
C. Defect Remedies

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1. Low areas shall be remedied by replacing the material for the full depth of treatment, rather than adding a thin layer of material to the completed work, or as required by the Owner.
2. Faulty work shall be replaced for the full depth of treatment.
3. All Defect Remedies shall be completed at the Contractors sole expense and at no additional time allowed to the contract.

3.13 Traffic

A. Local traffic and construction equipment may be allowed on the completed section if the section has had time to cure or the application of a single course surface treatment has been completed.

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SECTION 32 11 13.26
CEMENT TREATED SUBGRADE

PART 1 - GENERAL

1.01 Description
A. This specification shall govern work required for the furnishing, mixing, compacting of Cement Treated Subgrade as required to complete the project.

1.02 References *The latest edition of the referenced item below shall be used.*
A. ASTM C-150 – Portland Cement
B. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 204 “Sprinkling”
C. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 210 “Rolling”
D. Texas Department of Transportation (TxDOT) Test Procedure Tex-101-E Preparing Soil and Flexible Base Materials for Testing
E. Texas Department of Transportation (TxDOT) Test Procedure Tex-103-E Determining Moisture Content in Soil Materials
F. Texas Department of Transportation (TxDOT) Test Procedure Tex-115-E Field Method for Determining In-Place Density of Soils and Base Materials
G. Texas Department of Transportation (TxDOT) Test Procedure Tex-120-E Soil-Cement Testing
H. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS-4600, Hydraulic Cement
I. TxDOT’s Hydraulic Cement Quality Monitoring Program (HCQMP)

1.03 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related specification(s).
   2. Cement information shall include date information on when it was manufactured and a use-by date.
B. Test reports
   1. Submit within three (3) working days after the test is completed to the following:
      a. Owner,
      b. Owner, and
      c. As directed by the Owner.
   2. All test reports shall clearly indicate the following information:
      a. Location of area tested by the following,
         1) Station
         2) Distance from Center Line
         3) Travel lane.
         4) Or as otherwise specified
      b. Date,
      c. Company whom performed test,
      d. Person by who performed test by one of the following:
         1) Name,
         2) Initials,
         3) Employee identification number,
      e. Material tested,
      f. Test used,
      g. Test values obtained,
      h. Indicate Pass or Fail in accordance with the Specification(s) and Drawing(s)

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requirements,

i. Person with the testing company who has reviewed and approves the test results by all of the following:
   1) Printed name
   2) Signature
   3) License number

PART 2 - PRODUCTS

2.01 Soil

A. Soil shall consist of Owner approved material, free from vegetation or other objectionable matter, encountered in the roadbed section and other acceptable material used in the preparation of the roadbed in accordance with this specification.

2.02 Cement

A. Cement shall be Type I Portland cement.
B. Cement shall meet the requirements of TxDOT DMS-4600, TxDOT's Hydraulic Cement Quality Monitoring Program (HCQMP), and ASTM C-150 Type I Portland Cement.
   1. Sources not on the HCQMP or other sources to be used in combination with an approved source will require approval before use.
C. Cement shall be used prior to the expiration date.

2.03 Water

A. Water shall be free from deleterious contaminants and other objectionable materials to the hardening of the cement treatment.
B. Source of water shall be approved by the Owner.

PART 3 - EXECUTION

3.01 General

A. It is the primary requirement of this specification to secure a completed course of treated material containing a uniform cement treated mixture, free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth and with a smooth surface suitable for placing subsequent courses.
B. It shall be the responsibility of the Contractor to regulate the sequence of his work, to use the proper amount of cement, maintain the work and rework the courses as necessary to meet the requirements.
C. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.

3.02 Equipment

A. General
   1. The machinery, tools and equipment necessary for proper execution of the work shall be on the project and approved by the Owner prior to the beginning of construction operations.
   2. All machinery, tools, and equipment used shall be maintained in a satisfactory and workmanlike manner.
   3. The Contractor shall at all times provide sufficient equipment to enable continuous execution of the work and its completion in the required number of working days.
   4. The equipment provided by the Contractor shall be operated by experienced and capable workmen and shall be that necessary to provide a cement treatment meeting the requirements herein specified.

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B. Transportation Equipment
   1. Shall be capable of hauling the material in a method recognized by the industry as being satisfactory for the material being transported.
   2. Shall be of type recommended by manufacturer of product(s).
   3. Equipment shall be in compliance with local, state, and federal laws and regulations.
C. Rollers
   1. Shall be in accordance with TxDOT Item 210.
D. Storage Facility
   1. Material shall be stored and handled in closed weatherproof containers until immediately before distribution.
   2. If storage bins are used, they shall be completely enclosed.
   3. Material in bags shall be stored in weatherproof buildings with adequate protection from ground dampness.
E. Cement Slurry Equipment
   1. Slurry tanks shall be equipped with agitation devices to slurry cement on the project or other approved location.
F. Pulverization Equipment
   1. Provide pulverization equipment that:
      a. Cuts and pulverizes material uniformly to the proper depth with cutters that will plane to a uniform surface over the entire width of the cut.
      b. Provides a visible indication of the depth of cut at all times.
      c. Uniformly mixes the materials.

3.03 Material Transportation

A. General
   1. All material shall be transported in accordance with local, state, and federal regulations.
B. Truck
   1. Each truck shall have the weight of cement determined on certified scales.
   2. All exit ports are to be sealed at the plant.
C. Bags
   1. Each bag shall bear the manufacturer's certified weight.
   2. Bags varying more than five-percent (5%) from that weight may be rejected and the average weight of bags in any shipment, as shown by weighing ten-percent (10%), with a minimum of five (5), of the bags taken at random from each pallet, shall not be less than the manufacturer's certified weight.

3.04 Preparation of Roadbed

A. General
   1. Before other construction operations are commenced, the roadbed shall be graded and shaped as required to construct the cement treatment for material in place in conformance with the lines, grades, thickness and typical cross section shown on the Drawings.
   2. Unsuitable soil or material shall be removed and replaced with acceptable soil.
   3. The subgrade shall be firm and able to support without displacing the construction equipment and the compaction hereinafter specified.
   4. Soft or yielding subgrade shall be corrected and made stable before construction proceeds.
B. Pulverization
   1. The soil shall be pulverized so that 100% of the material passes the two and one-half-inch (2-1/2”) sieve when tested from the roadway in the roadway condition by TxDOT Tex-101-E.

3.05 Placement

A. General

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1. It is the primary requirement of this specification to secure a completed course of treated material containing a uniform cement mixture, free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth and with a smooth surface suitable for placing subsequent courses.
2. It shall be the responsibility of the Contractor to regulate the sequence of his work, to use the proper amount of cement, maintain the work and rework the courses as necessary to meet the requirements.

B. Application
   1. General
      a. Cement shall be spread only on that area where the first mixing operations can be completed during the same working day.
      b. Quantity of cement to be used is to be determined by the Contractor and approved by the Owner if not on the Drawings.
         1) Any rates indicated on the Drawings are the result of preliminary tests and shall be verified.
         2) Application rate may be varied by the Owner, if conditions warrant.
      c. Unless otherwise approved by the Owner, the cement operation shall not be started when the air temperature is below 40º F and falling, but may be started when the air temperature is above 35º F and rising.
         1) The temperature will be taken in the shade and away from artificial heat.
         2) Cement shall not be placed when weather conditions in the opinion of the Owner are unsuitable.

C. Method
   1. General
      a. Unless otherwise shown on the Drawings, cement shall be applied at a rate in pounds of dry cement per square yards, in the form of a slurry.
   2. Slurry Method
      a. The cement shall be mixed with water to form a slurry with a solids content approved by the Owner.
      b. The cement shall be mixed with water in trucks with approved distributors and applied as a slurry.
      c. The distribution of cement at the rate(s) required shall be attained by successive passes over a measured section of roadway until the proper cement content has been secured.
      d. Slurry shall be applied within two (2) hours of adding water and when the roadway is at moisture content drier than optimum.
         1) The percentage of moisture in the soil, at the time of cement application, shall not exceed the quantity that will permit uniform and intimate mixture of soil and cement and it shall not exceed the specified optimum moisture content for the soil cement mixture.
   3. Dry Method
      a. Dry placing is not allowed unless approved by the Owner and:
         1) The cement is distributed by an approved spreader at the specified rate or as directed by the Owner.
         2) The cement is distributed at a uniform rate and in such a manner as to reduce the scattering of cement by the wind.
      b. The material shall be sprinkled as approved by the Owner.
      c. The distribution of cement at the rate(s) required shall be attained by successive passes over a measured section of roadway until the proper cement content has been secured.
      d. Cement shall be applied to the roadway and water and mixing shall commence to

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permit uniform and intimate mixture of soil and cement and it shall not exceed the specified optimum moisture content for the soil-cement mixture.

3.06 Delivery Certification

A. Certification of cement quantity and quality shall be provided as required to monitor the application.
B. Certification should be in the form of weight tickets which indicate the actual weight of dry cement.

3.07 Mixing

A. General
   1. Portland cement treatment for materials in place may be constructed with any machine or combination of machines and auxiliary equipment that will produce results as outlined in this specification.
   2. Mixing shall begin immediately once cement is applied.
   3. The mixer shall in one (1) continuous operation mix the soil and cement full depth, and the required moisture uniformly, thoroughly moist-mix the soil, cement and water, until a homogeneous mixture is obtained
   4. The mixer shall spread the completed soil cement mixture evenly over the machine processed width of the subgrade and leave it in a loose condition ready for immediate compaction.
   5. The soil and cement mixture shall not remain undisturbed, after mixing and before compacting, for more than 30 minutes.
B. Moisture
   1. The mixture shall be sprinkled in accordance with TxDOT Item 204 to maintain optimum mixing moisture.
C. The soil shall be mixed so that, the material will meet the following requirement in Table 1 when tested from the roadway in the roadway condition by TxDOT Tex-101-E.

Table 1
Gradation Requirements

Sieve Size	Minimum Percent (%) Passing
1-3/4”	100
3/4”	85
#4	60

3.08 Compaction

A. General
   1. Prior to the beginning of compaction, the mixture shall be in a loose condition for its full depth.
   2. Compaction of the mixture shall begin immediately after mixing and be complete within two (2) hours after the application of cement.
   3. Compaction shall continue until the entire depth of mixture is uniformly compacted as hereinafter specified.
   4. Bring each layer to the moisture content required.
      a. At the start of compaction, the percentage of moisture in the mixture and in unpulverized soil lumps, based on over-dry weights, shall not be below or more than two (2) percentage points above the specified optimum moisture content and shall be less than that quantity which will cause the soil-cement mixture to become unstable during compaction and finishing.
      b. When necessary, sprinkle the material in accordance with TxDOT Item 204.
   5. Begin rolling longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least one-half (1/2) the width of the roller unit.

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6. On superelevated curves, begin rolling at the low side and progress toward the high side.
7. Offset alternate trips of the roller.
8. Operate rollers at a speed between 2 and 6 MPH, or as directed.
9. When the uncompacted soil-cement mixture is wetted by rain so that the average moisture content exceeds the tolerance given at the time of final compaction, the entire section shall be reconstructed in accordance with this specification at the sole expense of the Contractor.
10. Rework, recompact, and refinish material that fails to meet or that loses required moisture, density, stability, or finish before the next course is placed or the project is accepted.
11. Continue work until specification requirements are met.
12. Use mechanical tamps in areas inaccessible to rollers.
13. If the total thickness of the material to be treated cannot be mixed in one (1) operation, the previously mixed material shall be bladed to a windrow just beyond the area to be treated and the next layer mixed with cement as previously specified.
    a. The first layer of the material shall be compacted in such a manner that the treated material will not be mixed with the underlying material.
14. In addition to the requirements specified for density, the full depth of the material shown on the Drawings shall be compacted to the extent necessary to remain firm and stable under construction equipment.
15. Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface, upon completion, shall be smooth and in conformity with the typical section shown on the Drawings and to the established lines and grades.
16. After each section is completed, tests as necessary will be made by the Contractor.

B. Density Control
1. All testing to ensure density requirements shall be completed by a testing facility that is capable of performing all the required tests and is approved by the Owner.
2. Determine the moisture content in the mixture at the beginning of and during compaction in accordance with TxDOT Tex-103-E.
3. Compact to a minimum ninety-five percent (95%) of the maximum density determined in accordance with Tex-121-E, unless otherwise shown on the Drawings.
4. The Contractor shall determine roadway density at a frequency of one (1) test per one-hundred feet (100') per lane per lift staggered, of completed travel lane sections and under the curb and gutter, unless noted otherwise, or directed by Owner.
5. If the material fails to meet the density requirements, it shall be it shall be reworked as necessary to meet these requirements and retested.

C. Rework
1. General
    a. Rework, when required to meet pulverization requirements or density.
    b. Reworking shall include loosening, road mixing as approved by the Owner, compacting, and finishing.
    c. When a section is reworked, a new optimum moisture content in accordance with TxDOT Tex-103-E and density in accordance with Tex-121-E will be determined from the reworked material.
    d. Compact in accordance with Section 3.8 of this specification.
    e. Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface, upon completion, shall be smooth and in conformity with the typical section shown on the Drawings and to the established lines and grades.
    f. Shall include the addition of additional cement at the initial application rate or as deemed necessary by the Owner.

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3.09 Finishing

A. General
   1. Immediately after completing compaction the resulting surface shall be thoroughly rolled with a pneumatic tire roller and clipped, skinned, or tight bladed by a maintainer or subgrade trimmer to a depth of approximately quarter-inch (1/4”).
   2. The surface shall then be thoroughly compacted with the pneumatic roller, adding small increments of moisture as needed during rolling until a smooth surface is attained.
   3. If aggregate larger than No. 4 is present in the mixture; one (1) complete coverage of the section with the flat wheel roller shall be made immediately after the clipping operation.
   4. When directed by the Owner, surface finishing methods may be varied from this procedure provided a dense, uniform surface, free of surface compaction planes, is produced.
   5. The moisture content of the surface material must be maintained at its specified optimum during all finishing operations.
   6. Surface compaction, rolling, blading and finishing shall proceed in such a manner as to produce a smooth, closely knit surface, free of cracks, ridges or loose material conforming to the crown, grade and line shown on the Drawings, within three (3) hours of initial mixing.
   7. After the final layer or course of the treated material has been compacted, it shall be brought to the required lines and grades in accordance with the Drawings or as directed by the Owner.
   8. Remove all loosened material from the surface of the section and dispose of it at an approved location.
   9. Do not surface patch.
B. Finish grade of constructed subgrade in accordance with the following grade tolerances:
   1. Staged Construction
      a. Grade to within one-inch (1”) in the cross-section and one-inch (1”) in sixteen-feet (16’) measured longitudinally.
   2. Turnkey Construction
      a. Grade to within half-inch (1/2”) in the cross-section and half-inch (1/2”) in sixteen-feet (16’) measured longitudinally.

3.10 Curing

A. The completed section shall be moist cured or prevented from drying by:
   1. Sprinkling in accordance with TxDOT Item 204, and / or
   2. Addition of an asphalt material at the rate of 0.05 to 0.20 gallons per square yard.
B. Moisture content shall be maintained at no lower than 2.5 percentage points below optimum.
C. Curing shall continue for at least three (3) days before further courses are added or traffic is permitted, unless otherwise approved by the Owner.
D. When the Drawings provide for the treated material to be covered by other courses of material, the next course shall be applied within fourteen (14) calendar days after final compaction is completed, unless otherwise approved by the Owner.

3.11 Construction Joints

A. At the end of each day's construction, a straight transverse construction joint shall be formed by cutting back into the total width of completed work to form a true vertical face free of loose and shattered material.
B. For large and wide areas the subgrade shall be built in a series of parallel lanes of convenient length and width meeting and approval of the Owner.

3.12 Maintenance

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A. The Contractor is required to maintain the subgrade in good condition until all work has been completed and accepted.
B. Maintenance shall include, but not limited to, the immediate remedy of any defects, maintaining moisture content, repairing damages due to construction and/or local traffic.
C. Defect Remedies
    1. Low areas shall be remedied by replacing the material for the full depth of treatment, rather than adding a thin layer of material to the completed work, or as required by the Owner.
    2. Faulty work shall be replaced for the full depth of treatment.
    3. All Defect Remedies shall be completed at the Contractors sole expense and at no additional time allowed to the contract.

3.13 Traffic

A. Local traffic and construction equipment may be allowed on the completed section if the section has had time to cure or the application of a single course surface treatment has been completed.

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SECTION 32 11 23
FLEXIBLE BASE COURSE

PART 1 - GENERAL

1.01 Description
A. This specification shall govern work required for the furnishing and placing Flexible Base Course as required to complete the project.

1.02 Related Sections
A. 32 11 00 SUBGRADE AND BASE COURSE
B. 32 11 13.13 LIME TREATED SUBGRADE
C. 32 11 13.26 CEMENT TREATED SUBGRADE
D. 32 12 13.19 PRIME COAT

1.03 References *The latest edition of the referenced item below shall be used.*
A. AASHTO T193 – Standard Method of Test for The California Bearing Ratio
B. ASTM C-131 – Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
C. ASTM C-150 – Standard Specification for Portland Cement
D. ASTM D-1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
E. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 204 “Sprinkling”
F. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 210 “Rolling”
G. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 247 “Flexible Base”
H. Texas Department of Transportation (TxDOT) Test Procedure Tex-101-E Preparing Soil and Flexible Base Materials for Testing
I. Texas Department of Transportation (TxDOT) Test Procedure Tex-103-E Determining Moisture Content in Soil Materials
J. Texas Department of Transportation (TxDOT) Test Procedure Tex-104-E Determining Liquid Limits of Soils
K. Texas Department of Transportation (TxDOT) Test Procedure Tex-106-E Calculating the Plasticity Index of Soils
L. Texas Department of Transportation (TxDOT) Test Procedure Tex-110-E Particle Size Analysis of Soils
M. Texas Department of Transportation (TxDOT) Test Procedure Tex-115-E Field Method for Determining In-Place Density of Soils and Base Materials
N. Texas Department of Transportation (TxDOT) Test Procedure Tex-406-A Material Finer Than 75 mm (No. 200) Sieve in Mineral Aggregates (Decantation Test For Concrete Aggregates)
O. Texas Department of Transportation (TxDOT) Test Procedure Tex-460-A Determining Crushed Face Particle Count
P. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS-4600, Hydraulic Cement
Q. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS-6350, Lime and Lime Slurry
R. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS-11000, Evaluating and Using Nonhazardous Recyclable Materials Guidelines
S. TxDOT’s Hydraulic Cement Quality Monitoring Program (HCQMP)

1.04 Submittals
A. Product Information

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1. Clearly indicate within submittal that the product is in compliance with this and related specification(s).

B. Design Mix Information
   1. Clearly indicate within submittal the following:
      a. Gradation
      b. Admixture Ratio (if admixture is required)
      c. The Texas Required Base Thickness
      d. Addition information as directed by Owner

C. Test reports
   1. Submit within three (3) working days after the test is completed to the following:
      a. Owner
      b. Owner, and
      c. As directed by the Owner
   2. All test reports shall clearly indicate the following information:
      a. Location of area tested by the following,
         1) Station
         2) Distance from Center Line
         3) Travel lane designation
         4) Or as otherwise specified
      b. Date
      c. Weather
         1) Temperature
         2) General weather conditions
      d. Company whom performed test
      e. Person by who performed test by one of the following:
         1) Name
         2) Initials
         3) Employee identification number
      f. Material tested
      g. Test used
      h. Test values obtained
      i. Indicate Pass or Fail in accordance with the Specification(s) and Drawing(s) requirements
      j. Person with the testing company who has reviewed and approves the test results by all of the following:
         1) Printed name
         2) Signature
         3) License number

PART 2 - PRODUCTS

2.01 Base Material

A. Shall be Type A, Grade 1, in accordance with TxDOT Item 247, unless otherwise indicated on the Drawings or by the Owner.

2.02 Water

A. Water shall be free from deleterious contaminates and other objectionable materials.
B. Source of water shall be approved by the Owner.

2.03 Prime Coat

A. Shall be bituminous material in accordance with Section 32 12 13.19 PRIME COAT.

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PART 3 - EXECUTION

3.01 General

A. It is the primary requirement of this specification to secure a completed course of treated material containing a uniform mixture free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth and with a smooth surface suitable for placing subsequent courses.
B. It shall be the responsibility of the Contractor to regulate the sequence of his work to process a sufficient quantity of material to provide full depth as shown on Drawings, to use the proper amount of chemical stabilization material (if required), maintain the work and rework the courses as necessary to meet the above requirements.
C. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
    1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.

3.02 Equipment

A. General
    1. The machinery, tools and equipment necessary for the proper construction of the work shall be on the project, and be approved by the Owner.
    2. All machinery, tools, and equipment used shall be maintained in a satisfactory and workmanlike manner.
    3. The Contractor shall at all times provide sufficient equipment to enable continuous execution of the work and its completion in the required number of working days.
    4. The equipment provided by the Contractor shall be operated by experienced and capable workmen and shall be that necessary to provide a cement treatment meeting the requirements herein specified.
B. Transportation Equipment
    1. Shall be capable of hauling the material in a method recognized by the industry as being satisfactory for the material being transported.
    2. Shall be of type recommended by manufacturer of product(s).
    3. Equipment shall be in compliance with local, state, and federal laws and regulations.
C. Rollers
    1. Shall be in accordance with TxDOT Item 210.

3.03 Material Transportation

A. General
    1. All material shall be transported in accordance with local, state, and federal regulations.
B. Truck
    1. Each truck shall have the weight/quantity of material determined on certified scales or a Owner approved method.

3.04 Preparation of Roadbed

A. Before placing base course, the subgrade shall be graded and shaped in conformance with the lines, grades, thickness and typical cross section as shown on the Drawings, in accordance with Section 32 11 13.13 LIME TREATED SUBGRADE or Section 32 11 13.26 CEMENT TREATED SUBGRADE, and/or as indicated on the Drawings or as directed by the Owner.
B. Unsuitable soil or material shall be removed and replaced with acceptable soil.
C. The subgrade shall be firm and able to support without displacing the construction equipment and the compaction hereinafter specified.
D. Soft or yielding subgrade shall be corrected and made stable before construction proceeds.

3.05 Test Section

A. The Contractor shall be required to construct a "Test Section".
B. The first section of base shall serve as a test section.

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C. Its length shall be between 300 and 500 linear feet single lane width.
D. Evaluation of the equipment and procedure will be done during this section.
E. In case it is found that the work is not satisfactory with respect to the specification requirements, the Contractor shall revise his procedures and augment or replace equipment as necessary to assure work completed in accordance with the specifications.
F. Additional test sections may be required as directed by the Owner.
G. Test sections not conforming to the requirements of the specifications shall be reconstructed.

3.06 Delivery Certification

A. Certification of all materials quantity and quality shall be provided as required to monitor the application.
B. Certification should be in the form of weight tickets which indicate the actual weight of material.

3.07 Placing

A. Spread and shape the material into a uniform layer with an approved spreader the same day it is delivered unless otherwise approved.
B. Construct loose material layers that are a maximum of six-inches (6”) in thickness.
C. Maintain the shape of the course.
D. Sprinkle in accordance with TxDOT Item 204 to control dust.

3.08 Compaction

A. General
    1. Prior to the beginning of compaction, the mixture shall be in a loose condition for its full depth for a maximum depth of six-inches (6”).
    2. Compaction shall continue until the entire depth of mixture is uniformly compacted as hereinafter specified.
    3. Bring each layer to the moisture content required.
        a. At the start of compaction, the percentage of moisture in the mixture and in unpulverized soil lumps, based on over-dry weights, shall not be below or more than two (2) percentage points above the specified optimum moisture content and shall be less than that quantity which will cause the soil cement mixture to become unstable during compaction and finishing.
        b. Maintain moisture content within three-percent (3%) of optimum on the wet side.
            1) When necessary, sprinkle the material in accordance with TxDOT Item 204.
    4. Begin rolling longitudinally at the sides and proceed toward the center, overlapping on successive trips by at least one-half (1/2) the width of the roller unit.
    5. On superelevated curves, begin rolling at the low side and progress toward the high side.
    6. Offset alternate trips of the roller.
    7. Operate rollers at a speed between 2 and 6 MPH, or as directed.
    8. When the uncompacted soil mixture is wetted by rain so that the average moisture content exceeds the tolerance given at the time of final compaction, the entire section shall be reconstructed in accordance with this specification at the sole expense of the Contractor.
    9. Rework, recompact, and refinish material that fails to meet or that loses required moisture, density, stability, or finish before the next course is placed or the project is accepted.
    10. Continue work until specification requirements are met.
    11. Use mechanical tamps in areas inaccessible to rollers.
    12. In addition to the requirements specified for density, the full depth of the material shown on the Drawings shall be compacted to the extent necessary to remain firm and stable under construction equipment.
    13. Throughout this entire operation, the shape of the course shall be maintained by blading,

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and the surface, upon completion, shall be smooth and in conformity with the typical section shown on the Drawings and to the established lines and grades.

14. After each section is completed, tests as necessary will be made by the Contractor.

3.02 Density Control

A. All testing to ensure density requirements shall be completed by a testing facility that is capable of performing all the required tests and is approved by the Owner.
B. Determine the moisture content in the mixture at the beginning of and during compaction in accordance with TxDOT Tex-103-E.
C. Compact to a minimum ninety-five percent (95%) of the maximum density determined in accordance with Tex-121-E, unless otherwise shown on the Drawings.
D. The Contractor shall determine roadway density at a frequency of one (1) test per one-hundred feet (100') per lane per lift staggered, of completed travel lane sections and under the curb and gutter, unless noted otherwise, or directed by Owner.
E. If the material fails to meet the density requirements, it shall be it shall be reworked as necessary to meet these requirements and retested.

3.09 Finishing

A. General
   1. Immediately after completing compaction the resulting surface shall be thoroughly rolled with a pneumatic tire roller and clipped, skinned, or tight bladed by a maintainer or subgrade trimmer to a depth of approximately quarter-inch (1/4").
   2. The surface shall then be thoroughly compacted with the pneumatic roller, adding small increments of moisture as needed during rolling until a smooth surface is attained.
   3. If aggregate larger than No. 4 is present in the mixture; one (1) complete coverage of the section with the flat wheel roller shall be made immediately after the clipping operation.
   4. When directed by the Owner, surface finishing methods may be varied from this procedure provided a dense, uniform surface, free of surface compaction planes, is produced.
   5. The moisture content of the surface material must be maintained at its specified optimum during all finishing operations.
   6. Surface compaction, rolling, blading and finishing shall proceed in such a manner as to produce a smooth, closely knit surface, free of cracks, ridges or loose material conforming to the crown, grade and line shown on the Drawings, within three (3) hours of initial mixing.
   7. After the final layer or course of the material has been compacted, it shall be brought to the required lines and grades in accordance with the Drawings or as directed.
   8. Remove all loosened material from the section and dispose of it at an approved location.
   9. Do not surface patch.
B. Finish grade of constructed subgrade in accordance with the following grade tolerances:
   1. Staged Construction
      a. Grade to within half-inch (1/2") in the cross-section and half-inch (1/2") in sixteen-feet (16') measured longitudinally.
   2. Turnkey Construction
      a. Grade to within quarter-inch (1/4") in the cross-section and quarter-inch (1/4") in sixteen-feet (16') measured longitudinally.

3.10 Prime Coat

A. Shall be in accordance with Section 32 12 13.19 PRIME COAT

3.11 Construction Joints

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A. At the end of each day's construction, a straight transverse construction joint shall be formed by cutting back into the total width of completed work to form a true vertical face free of loose and shattered material.
B. For large and wide areas the subgrade shall be built in a series of parallel lanes of convenient length and width meeting and approval of the Owner.

3.12 Maintenance

A. The Contractor is required to maintain the base in good condition until all work has been completed and accepted.
B. Maintenance shall include, but not limited to, the immediate remedy of any defects, maintaining moisture content, repairing damages due to construction and/or local traffic.
C. Defect Remedies
    1. Low areas shall be remedied by replacing the material for the full depth of treatment, rather than adding a thin layer of material to the completed work, or as required by the Owner.
    2. Faulty work shall be replaced for the full depth of treatment.
    3. All Defect Remedies shall be completed at the Contractors sole expense and at no additional time allowed to the contract.

3.13 Traffic

A. The Contractor shall not be permitted to drive heavy equipment over completed portions, but pneumatic-tired equipment required for hauling cement, and water may be permitted after the surface has hardened sufficiently to prevent the equipment from marring the surface, provided protection and cover specified herein are not impaired.
B. The base may be opened to local traffic as soon as the prime coat has been applied and sanded or cured as necessary to prevent it from being picked up by traffic.
C. It may be opened to all traffic after seven (7) calendar days.
    1. Surface course shall be applied prior to opening to through traffic.

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SECTION 32 12 13.19
PRIME COAT

PART 1 - GENERAL
1.01 Description
A. This specification shall govern work required for the application of asphalt material on the completed base course and/or other approved areas as required to complete the project.

1.02 References *The latest edition of the referenced item below shall be used.*
A. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 210 “Rollers”
B. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 300 “Asphalts, Oils, and Emulsions”
C. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 310 “Prime Coat”
D. Texas Department of Transportation (TxDOT) Test Procedure Tex-922-K “Calibrating Asphalt Distribution Equipment”

1.03 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related specification(s).
B. Bituminous material manufacturer information and recommendations.
C. Equipment information as required.

PART 2 - PRODUCTS
2.01 Bituminous Material
A. The material used shall be MC-30 in accordance with TxDOT Item 300, unless otherwise specified on the Drawings or directed by the Owner.

2.02 Blotter Material
A. Unless otherwise shown on the Drawings or approved, use either:
   1. Native sand
   2. Base course sweepings obtained from cleaning the base

PART 3 - EXECUTION
3.01 General Information
A. Prime coat shall be applied when the air temperature is 60° F and above, or is above 50° F and is rising.
   1. The air temperature being taken in the shade and away from artificial heat.
B. Material shall not be placed when general weather conditions, in the opinion of the Owner, are not suitable.
C. Do not permit traffic, hauling, or placement of any subsequent courses shall be permitted over the freshly applied prime coat until authorized by the Owner.
D. The Contractor shall be responsible for the maintenance of the surface until placement of subsequent courses or the Owner accepts the work.
E. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.

3.02 Equipment
A. General

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1. All storage tanks, piping, retorts, booster tanks and distributors used in storing or handling bituminous material shall be kept clean and in good operating condition at all times, and they shall be operated in such manner that there will be no contamination of the bituminous material with foreign material.
2. It shall be the responsibility of the Contractor to provide and maintain in good working order a recording thermometer at the storage-heating unit at all times.
3. The Contractor shall provide all necessary facilities for determining the temperature of the bituminous material in all of the heating equipment and in the distributor, for determining the rate at which it is applied, and for securing uniformity at the junction of two (2) distributor loads.

B. Distributor
1. Furnish a distributor that will apply the bituminous material uniformly at the specified rate or as directed.
2. Calibration
a. Furnish to the Owner a distributor test report, no more than six (6) months old, documenting that the variation in output for individual nozzles of the same size does not exceed ten percent (10%) when tested at the greatest shot width in accordance with Tex-922-K.
b. Include the following documentation on the test report:
1) The serial number of the distributor
2) A method that identifies the actual nozzle set used in the test
3) The fan width of the nozzle set at a twelve-inch (12”) bar height
3. Transverse Variance Rate
a. When a transverse variance rate is shown on the Drawings, confirm that the nozzles outside the wheel paths will output a predetermined percentage more of bituminous material by volume than the nozzles over the wheel paths.
b. When a transverse variance rate is required, perform the test using the type and grade of bituminous material to be used on the project.
c. The Owner may verify the transverse rate and distribution at any time.
1) If verification does not meet the requirements, correct deficiencies and furnish a new test report.

C. Tank Volume
1. Furnish a volumetric calibration and strap stick for the distributor tank in accordance with Tex-922-K, “Calibrating Asphalt Distribution Equipment,” Part I.
2. Calibrate the distributor within the previous three (3) years of the date first used on the project.
3. The Owner may verify calibration accuracy in accordance with TxDOT Tex-922-K.

D. Computerized Distributor
1. When paying for bituminous material by weight, the Owner may allow use of the computerized distributor display to verify application rates.
2. Verify application rate accuracy at a frequency acceptable to the Owner.

E. Broom
1. Furnish rotary, self-propelled brooms.

F. Rollers
1. Rollers provided shall meet the requirements for their type as shown in TxDOT Item 210.

G. Digital Measuring Instrument
1. Furnish a vehicle with a calibrated digital-measuring instrument accurate to ±6 ft. per mile.

3.03 Surface Preparation

A. When, in the opinion of the Owner, the base and/or area is satisfactory to receive the prime

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coat, the surface may be cleaned by sweeping or other approved methods.

B. If found necessary by the Owner, the surface shall be lightly sprinkled with water just prior to application of the bituminous material to control dust and ensure absorption.

3.04 Application

A. Bituminous
   1. The material shall be applied on the clean surface by an approved type of self-propelled pressure distributor so operated as to distribute the material in the quantity specified, evenly and smoothly under a pressure necessary for proper distribution.
   2. Shall be applied at a temperature within the recommended range per TxDOT Item 300.
      a. Apply material within 15° F of the selected temperature.
   3. Distribute the material smoothly and evenly at a pressure necessary for proper distribution at an application rate not exceed 0.20 gallon per square yard of surface, unless otherwise specified.
   4. After beginning of the work, should the yield on the bituminous material applied appear to be in error, the distributor shall be calibrated in a manner satisfactory to the Owner before proceeding with the work.
   5. During the application of the material, the Contractor shall take precautions to prevent splattering of adjacent pavement, curb, gutter, and structures.
   6. When directed roll the freshly applied material with a pneumatic-tire roller to ensure penetration.

B. Blotter
   1. Shall be spread in areas as directed by the Owner before allowing traffic to use the primed surface.
   2. Remove blotter material prior to placing subsequent courses.

3.05 Disposal of Materials

A. Disposal of all materials shall be in accordance with local, state, and federal regulations, and will be the responsibility of the Contractor.

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SECTION 32 12 16.13
PLANT-MIX ASPHALT PAVING

PART 1 - GENERAL

1.01 Description
A. This specification shall govern work required for the furnishing and installation of plant-mix asphalt paving as required to complete the project.

1.02 Related Sections
A. 32 12 13.19 PRIME COAT

1.03 References *The latest edition of the referenced item below shall be used.*
A. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 210 “Rolling”
B. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 300 “Asphalts, Oils, and Emulsions”
C. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 320 “Equipment for Asphalt Concrete Pavement”
D. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 340 “Dense-Graded Hot Mix Asphalt (Method)”
E. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 341 “Dense-Graded Hot Mix Asphalt (QC/QA)”
F. Texas Department of Transportation (TxDOT) Test Procedure Tex-106-E, Calculating the Plasticity Index of Soils
G. Texas Department of Transportation (TxDOT) Test Procedure Tex-107-E, Determining the Bar Linear Shrinkage of Soils
H. Texas Department of Transportation (TxDOT) Test Procedure Tex-203-F, Sand Equivalent Test
I. Texas Department of Transportation (TxDOT) Test Procedure Tex-207-F, Determining Density of Compacted Bituminous Mixtures
J. Texas Department of Transportation (TxDOT) Test Procedure Tex-212-F, Determining Moisture Content of Bituminous Mixtures
K. Texas Department of Transportation (TxDOT) Test Procedure Tex-217-F, Determining Deleterious Material and Decantation Test for Coarse Aggregates
L. Texas Department of Transportation (TxDOT) Test Procedure Tex-227-F, Theoretical Maximum Specific Gravity of Bituminous Mixtures
M. Texas Department of Transportation (TxDOT) Test Procedure Tex-236-F, Determining Asphalt Content from Asphalt Paving Mixtures by the Ignition Method
N. Texas Department of Transportation (TxDOT) Test Procedure Tex-243-F, Tack Coat Adhesion
O. Texas Department of Transportation (TxDOT) Test Procedure Tex-408-A, Organic Impurities in Fine Aggregate for Concrete
P. Texas Department of Transportation (TxDOT) Test Procedure Tex-410-A, Abrasion of Coarse Aggregate Using the Los Angeles Machine
Q. Texas Department of Transportation (TxDOT) Test Procedure Tex-411-A, Soundness of Aggregate Using Sodium Sulfate or Magnesium Sulfate
R. Texas Department of Transportation (TxDOT) Test Procedure Tex-460-A, Determining Crushed Face Particle Count
S. Texas Department of Transportation (TxDOT) Test Procedure Tex-461-A, Degradation of Coarse Aggregate by Micro-deval Abrasion

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T. Texas Department of Transportation (TxDOT) Bituminous Rated Source Quality Catalog (BRSQC)

1.04 Submittals

A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related specification(s).
B. Mixture design report
C. Quality Control Plan (QCP)
D. Truck “Pay Tickets”

PART 2 - PRODUCTS

2.01 General

A. All products shall be in accordance with TxDOT Item 340, unless otherwise indicated on the Drawings of by the Owner.
B. All sources and materials shall be TxDOT approved.

PART 3 - EXECUTION

3.01 General

A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, TxDOT Item 340, and industry standards.
   1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.
B. For this specification when a TxDOT Item is indicated the terms within the TxDOT Item shall be adjusted as follows:
   1. Department – TxDOT
   2. Engineer – Owner

3.02 Mixture Design

A. The mixture shall be designed in accordance with TxDOT Item 340 and conform to the requirements of this specification with the following modifications:
   1. The Owner (Engineer) will not be able to provide any software.
   2. The Contractor shall provide the Owner with a mixture design report that includes the following:
      a. The combined aggregate gradation, source, specific gravity, and percent of each material used,
      b. Results of applicable tests,
      c. The mixing and molding temperatures,
      d. All applicable correlation and correction factors,
      e. The signature(s) of the Level II specialist certified by TxDOT-approved hot-mix asphalt certification program who performed the design,
      f. The date the mixture design was performed,
      g. A unique identification number for the design.

3.03 Equipment

A. General
   1. Provide equipment for Asphaltic Concrete Paving in accordance with TxDOT Item 320.

3.04 Quality Control Plan

A. General
   1. It shall be the responsibility of the Contractor to design, produce, transport, place and compact the specified paving mixture in accordance with the requirements herein.
   2. The Owner will perform verification testing as needed.

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3. Provide quality control (QC) testing as needed to meet the requirements of this Item.
4. Provide a certified Level I-A specialist at the plant during production hours.
5. Provide a certified Level I-B specialist to conduct placement tests.
6. The requirements of TxDOT Item 341 shall be adhered to.

B. Quality Control Plan (QCP)
   1. General
      a. Unless otherwise shown on the Drawings, the Contractor shall develop and follow a Quality Control Plan (QCP).
      b. The QCP shall be submitted to the Owner and the on-site Inspector.
      c. Obtain approval from the Owner for changes to the QCP made during the project.
      d. The Owner may suspend operations if the Contractor fails to comply with the QCP.
      e. Submit a written QCP to the Owner and receive the Owner's approval of the QCP before beginning production.
   2. Include the following items in the QCP:
      a. Project Personnel
         1) Provide:
            a) A list of individuals that will conduct tests as well their associated certifications (i.e. Level IA, IB, and II certifications), including when certifications will expire for each individual
            b) A list of individuals responsible for QC with authority to take corrective action and the contact information for each individual listed
      b. Material Delivery and Storage
         1) Provide:
            a) The sequence of material processing, delivery, and minimum quantities to assure continuous plant operations
            b) Aggregate stockpiling procedures to avoid contamination and segregation
            c) Frequency, type, and timing of aggregate stockpile testing to assure conformance of material requirements before mixture production
            d) Procedure for monitoring the quality and variability of asphalt binder
      c. Production
         1) Detail:
            a) Loader operation procedures to avoid contamination in cold bins
            b) Procedures for calibrating and controlling cold feeds
            c) Procedures to eliminate debris or oversized material
            d) Procedures for adding and verifying rates of each applicable mixture component (e.g., aggregate, asphalt binder, RAP, lime, liquid antistrip)
            e) Procedures for reporting job control and acceptance test results
            f) Procedures to avoid segregation and drain-down in the silo
      d. Loading and Transporting
         1) Provide:
            a) The type and application method for release agents
            b) Truck loading procedures to avoid segregation
      e. Placement and Compaction
         1) Provide:
            a) The proposed agenda for mandatory pre-paving meeting including date and location
            b) The type and application method for release agents in the paver and on rollers, shovels, lutes, and other utensils
            c) Procedures for the transfer of mixture into the paver while avoiding segregation and preventing material spillage

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d) The process to balance production, delivery, paving, and compaction to achieve continuous placement operations
e) The paver operations (e.g., operation of wings, height of mixture in auger chamber) to avoid physical and thermal segregation and other surface irregularities
f) Procedures to construct quality longitudinal and transverse joints

3.05 Construction

A. Prime Coat
1. If a prime coat is required, it shall be applied in accordance with the requirements of Section 32 12 13.19 PRIME COAT.

B. Tack Coat
1. The material shall not be applied on a previously primed base until the primed base has completely cured to the satisfaction of the Owner.
2. The surface upon which the material is to be placed shall be thoroughly cleaned by sweeping or other approved methods to the satisfaction of the Owner.
3. The material shall be applied when the surface temperature is 60° F or higher unless otherwise approved.
4. All contact surfaces of base, curbs, structures, and joints shall be coated with the material.
5. During the application of the material, the Contractor shall take precautions to prevent splattering of adjacent pavement, curb, gutter, and structures.
6. The surface shall be given a uniform application of shall be applied at a rate ranging from 0.05 to 0.10 gallons per square yard and/or as shown on the Drawings.
7. When directed roll the freshly applied material with a pneumatic tire roller to ensure penetration as necessary.
8. The Owner may use TxDOT Tex-243-F to verify that the material has adequate adhesive properties.

C. Storage and Heating of Asphalt Materials
1. Asphalt cement shall not be heated to a temperature in excess of that recommended by the producer.
2. Asphalt storage equipment shall be maintained in a clean condition and operated in such a manner that there will be no contamination with foreign matter.

D. Proportioning
1. All materials shall be handled and proportioned in a manner that yield an acceptable mixture as herein specified and as defined by the job-mix.

E. Mixing
1. Weight Batch Plant
   a. In charging the weigh box and in charging the pugmill from the weigh box, such methods or devices shall be used as necessary to minimize segregation of the mixture.
2. Drum Mix Plant
   a. The amount of aggregate and asphalt cement entering the mixer and the rate of travel through the mixer shall be coordinated so that a uniform mixture of the desired gradation and asphalt content will be produced.
3. The mixture produced from each type of plant shall not vary from the job-mix by more than the tolerances and restrictions herein specified.
4. The mixture when discharged from the plant shall have a moisture content not greater than one-percent (1%) by weight of total mix when determined by TxDOT Tex-212-F.
5. The mixture produced from each type of plant shall be at a temperature between 250° F and 325° F, or as required.

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a. After a target mixing temperature has been established, the mixture when discharged from the mixer shall not vary from this temperature by more than 25° F.

F. Placing Asphaltic Concrete
1. General
a. The material shall not be applied on a previously primed base until the primed base has completely cured to the satisfaction of the Owner.
b. The asphalt mixture shall be spread on the approved prepared surface with a paving machine or other approved equipment in such a manner such that when properly compacted, the finished surface will be smooth or uniform density, and meet the requirements of the typical cross sections as shown on the Drawings.
2. Base Surface
a. The surface upon which the material is to be placed shall be thoroughly cleaned by sweeping or other approved methods to the satisfaction of the Owner.
b. Asphaltic material shall be placed when the surface temperature is 60° F or higher unless otherwise approved.
3. Placement Temperature
a. Asphaltic material shall be placed prior to it falling below 200° F.
1) If all or any portion of a load is found to be below the temperature then the load may be rejected and will need to be removed by the Contractor prior to placing any additional material.

G. Flush Structures
1. Adjacent to flush curbs, gutters, liners and structures, the surface shall be finished uniformly high so that when compacted, it will be one-quarter inch (1/4”) above the edge.

H. Construction joints
1. Joints of successive courses of asphaltic material shall be offset at least six-inches (6”).
2. Construction joints on surface courses shall coincide with lane lines, or as directed by the Owner.

I. Compacting
1. General
a. The asphalt mixture shall be compacted thoroughly and uniformly with the necessary rollers to obtain the required density and surface tolerances herein described and any requirements as shown on the Drawings.
b. Regardless of the method of compaction control followed, all rolling shall be completed before the mixture temperature drops below 175° F.
c. The use of hand tamps shall only occur in areas where rollers are not able to obtain compaction.
d. The edges of the pavement along curbs, headers and similar structures, and all places not accessible to the roller, or in such positions as will not allow thorough compaction with the rollers, shall be thoroughly compacted with lightly oiled tamps.
e. Rolling with a trench roller will be required on widened areas, in trenches and other limited areas where satisfactory compaction cannot be obtained with the approved rollers.
f. Unless otherwise directed, use only water or an approved release agent on rollers, tamps, and other compaction equipment.
1) Keep diesel, gasoline, oil, grease, and other foreign matter off the mixture.
2. In-Place Compaction Control
a. Use density control unless ordinary compaction control is specified on the Drawings.

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b. Use the control strip method given in TxDOT Tex-207-F to establish the rolling pattern for density controlled areas.
c. Where specific density or air void requirements are waived, furnish and operate compaction equipment as approved.
d. Do not use pneumatic-tire rollers if excessive pickup of fines by roller tires occurs.
e. When rolling with the three-wheel, tandem or vibratory rollers, it is recommended that rolling start by first rolling the joint with the adjacent pavement and then continue by rolling longitudinally at the sides and proceed toward the center of the pavement, overlapping on successive trips by at least one-foot (1').
f. Alternate trips of the roller should be slightly different in length.
g. On super-elevated curves, rolling should begin at the low side and progress toward the high side.
h. When rolling with vibratory steel-wheel rollers, equipment operation shall be in accordance with TxDOT Item 210, and the manufacturer's recommendations, unless otherwise directed by the Owner.
i. Vibratory rollers shall not be left vibrating while not rolling or when changing directions. In addition, vibratory rollers shall not be allowed in the vibrating mode on mats with a plan depth of less than one and one-half inches (1-1/2"), unless approved by the Owner.
j. The motion of the rollers shall be slow enough to avoid other than usual initial displacement of the mixture.
k. If any displacement occurs, it shall be corrected to the satisfaction of the Owner and/or Inspector.
l. Ensure pavement is fully compacted before allowing rollers to stand on the pavement.

3. Rolling Pattern
   a. Rolling patterns shall be established by the Contractor to achieve the maximum compaction.
   b. The selected rolling pattern shall be followed unless changes in the mixture or placement conditions occur which affect compaction.
   c. When changes in the mixture or placement conditions occur, a new rolling pattern shall be established.

J. In-Place Density and Air Voids
   1. In-place density control is required for all mixtures except for thin, irregular level-up courses.
   2. Material should be compacted to between ninety-two percent (92%) and ninety-six percent (96%) of maximum theoretical density or between four-percent (4%) and eight-percent (8%) air voids.
   3. Average density shall be greater than ninety-two percent (92%) and no individual determination shall be lower than ninety percent (90%).
   4. Density and Air Void Testing Rate
      a. Whichever is less
         1) One (1) set every 500 tons of compacted asphaltic material,
         2) One (1) set every 1,000 linear feet.
      b. Testing shall be in accordance with TxDOT Tex-207-F and TxDOT Tex-227-F.
      c. Pavement specimens, which shall be either cores or sections of the compacted mixture, will be tested as required to determine the percent air voids.
      d. Other methods, such as nuclear determination of in-place density, which correlate satisfactorily with actual project specimens may be used when approved by the Owner.

K. Thickness

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1. The total compacted average thickness of the combined HMAC courses shall not be less than the amount specified on the Drawings.
2. No more than ten percent (10%) of the measured thicknesses shall be more than one-quarter inch (1/4") less than the Drawing thickness.
3. If so, the quantity for pay shall be decreased as deemed appropriate by the Owner.

3.06 Ride Quality

A. General
   1. The pavement surface after compaction, shall be smooth and true to the established lines, grade, and cross-section.
B. Equipment
   1. Ten foot (10') straight edge.
   2. Diamond Grinding Equipment
      a. Shall be self-propelled powered grinding equipment that is specifically designed to smooth and texture pavements using circular blades.
      b. Shall have automatic grade control capable of grinding at least a three-foot (3') width longitudinally in each pass without damaging the pavement.
C. Testing
   1. The Owner, Inspector, and/or Owner may require any of the following tests to be performed to verify the project.
      a. Straight-Edge
         1) The Owner, Inspector, and/or Owner shall have the Contractor to test localized defects (obvious settlements, humps, ridges, etc.) with a ten-foot (10') straightedge placed parallel or perpendicular to the roadway centerline depending on location of defect.
         2) The maximum deviation shall not exceed one-eighth inch (1/8") in ten-feet (10').
      b. Mays Roughness Meter
         1) The surface shall be tested by the Owner with the Mays Roughness Meter.
         2) The Mays Roughness Value for each block (intersection to intersection) or 600-foot section, whichever is the less, shall not exceed ninety inches (90") per mile per traffic lane.
D. Correction of Deficiencies
   1. Areas not meeting criteria shall be corrected to the satisfaction of the Owner.
   2. Local defects
      a. The Contractor shall correct deficiencies by grinding and fog sealing the aggregate exposed.
      b. All areas that are corrected shall be retested.
   3. Mays Roughness Deficiencies
      a. For each block of 600-foot section not meeting this criteria, the Owner shall have the option of requiring that block or section to be reworked to meet the criteria, or paying an adjusted unit price for the surface course.
      b. The unit price adjustment shall be made on the following basis:
         1) Adjusted Unit Price = (Adjustment Factor) X Surface Course Unit Bid Price
         2) The adjustment factor shall be:
            a) For Residential Streets: Adjustment Factor = 1.999 - 0.0111 M
            b) For All Other Class Streets (Non Residential): Adjustment Factor = 1.287 - 0.0143 M, Where M - Mays Roughness Value
      c. In no case shall the Contractor be paid more than the unit bid price.
      d. If the surface course is an inverted penetration (surface treatment) the Mays Roughness Value observed will be reduced by ten inches (10") per mile, prior to applying the above criteria.

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3.07 Opening to Traffic

A. The pavement shall be opened to traffic when directed by the Owner.
B. Traffic shall not be allowed on pavement until the temperature is 150° F or lower unless otherwise directed.
C. The Contractor's attention is directed to the fact that all construction traffic allowed on pavement open to the public will be subject to the State laws governing traffic on highways.
D. If the surface ravels, flushes, ruts, or deteriorates prior to final acceptance it will be the Contractor's responsibility to correct this condition at his expense to the satisfaction of the Owner.

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SECTION 32 13 13
CONCRETE PAVING

PART 1 - GENERAL
1.01 Description
A. This specification shall govern work required for the installation of Concrete Paving as required to complete the project.
1.02 Related Sections
A. 03 21 11 REINFORCING STEEL
B. 03 31 11 CONCRETE STRUCTURES
1.03 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related specification(s).

PART 2 - PRODUCTS
2.01 Concrete
A. Unless otherwise specified on Drawings, materials and proportions for concrete used in construction under this item shall conform the requirements as specified for Class "A" Concrete under specification, Section 03 31 11 CONCRETE STRUCTURES.
B. All concrete shall be Class A with a minimum strength of 3,000 psi.
2.02 Reinforcing Steel
A. Reinforcing steel, if required, shall conform to the requirements as specified in the specification, Section 03 21 11 REINFORCING STEEL.
B. All steel shall be grade 60 with a minimum fy of 60,000 psi.
2.03 Expansion Joint Material
A. Expansion joint filler shall be in accordance with Section 03 31 11 CONCRETE STRUCTURES and as noted on the Drawings.
B. Cap seal shall be Greenstreak #610 or approved equal installed over expansion joint filler.
2.04 Backfill
A. Material shall be the same or similar to the surrounding area which is free of stones and debris, or as directed by Owner.

PART 3 - EXECUTION
3.01 General Information
A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.
B. Shall be constructed in sections of the lengths and widths shown on Drawings.
   1. Unless otherwise provided by the Drawings, no section shall be a length less than eight-feet (8’).
   2. Each section shall be separated by an expansion joint.
C. All work per day shall terminate at expansion joints.
D. Provide machinery, tools, and equipment necessary for proper execution of the work.
3.02 Excavation and Foundation
A. Excavation shall be shaped to line, grade per typical cross section, and hand tamped and sprinkled.
B. The subgrade shall be as shown on the Drawings.
3.03 Forms

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A. Forms shall be of wood or metal, of a section satisfactory to the Owner.
B. Be straight, free from warp, and of a depth equal to the thickness of the finished work.
C. Shall be securely staked to line and grade and maintained in a true position during the depositing of concrete.
D. Shall conform to the specified radius when placed on curves.

3.04 Reinforcing Steel

A. The reinforcing steel, if required, shall be placed in position as shown on the Drawings.
B. Care shall be exercised to keep all steel in its proper location.

3.05 Joints

A. Expansion Joints
   1. Shall be constructed a maximum of 39’-0” on center or as noted on Drawings or as directed by Owner.
      a. If attached to curb and gutter than the expansion joints shall align with the expansion joints of the curb and gutter, unless noted on the Drawings or directed by the Owner.
   2. Joint shall be 3/4” and be filled with expansion joint material placed vertically and at right angles to the longitudinal axis of the sidewalks.
   3. Where the paving abuts a retaining wall, sidewalk, curb, or other hard surface expansion joint shall be placed along the entire length.
   4. Expansion joint shall be placed around all obstructions protruding through paving.
   5. Dowels
      a. The dowel shall be extended across the joint nine inches (9”) minimum and be sleeved or greased.
      b. When adjacent to existing curb and gutter or to existing sidewalk dowels shall be drilled into the existing concrete on eighteen-inch (18”) on centers.

3.06 Control Joints

1. Shall be tooled at the time of concrete placement at a maximum of 4’-0” on centers or evenly spaced between expansion joints, or as noted on Drawings or directed by the Owner.
2. Shall be 1/2” depth by 1/8” width or as noted on Drawings or directed by Owner.

3.07 Concrete Placement

A. Concrete shall be mixed and placed in a manner satisfactory to the Owner.
B. The subgrade and reinforcement shall be slightly moist at the time the concrete is placed.
C. Shall be placed in the forms to the depth specified and spaded and tamped until thoroughly compacted and mortar entirely covers the surface.

3.08 Finishing

A. The top surface shall be floated with a wooden or metal float to a smooth gritty texture.
B. The outer edges and joints shall then be rounded with a one-half inch (1/2”) radius with approved tools or as shown on Drawings.
C. Surface Finish
   1. Shall be broom finish or as noted on the Drawings
      a. The surface shall be textured with a heavy broom finish perpendicular to the common travel way.
   2. Other Finish
      a. The surface shall be as noted on the Drawings or as directed by the Owner.

3.09 Curing

A. Within twenty (20) minutes of the surface being textured the curing compound shall be applied.
B. Other methods of curing as outlined in the specification Section 03 31 11 CONCRETE STRUCTURES will be acceptable with a required curing period of 72 hours.
C. Concrete must be protected from freezing temperatures for at least three (3) days.

3.10 Backfill and Grading

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A. Material shall be the same or similar to the surrounding area which is free of stones and debris, or as directed by Owner.
B. Grading shall promote positive drainage

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SECTION 32 16 13.13
CURB & GUTTER

PART 1 - GENERAL
1.01 Description
A. This specification shall govern work required for the installation of Curbs and Gutters as required to complete the project.
1.02 Related Sections
A. 03 31 11 CONCRETE STRUCTURES
B. 03 21 11 REINFORCING STEEL
1.03 Submittals
A. Product Information
1. Clearly indicate within submittal that the product is in compliance with this and related specification(s).

PART 2 - PRODUCTS
2.01 Concrete
A. Unless otherwise specified on Drawings, materials and proportions for concrete used in construction under this specification shall conform the requirements as specified for Class "A" Concrete under specification, Section 03 31 11 CONCRETE STRUCTURES.
B. All concrete shall be Class A with a minimum 28-day compressive strength of 3,000 psi.
2.02 Reinforcing Steel and Dowels
A. Reinforcing steel and Dowels, if required, shall conform to the requirements as specified in the specification, Section 03 21 11 REINFORCING STEEL, or as noted on the Drawings.
B. All steel shall be Grade 60 with a minimum fy of 60,000 psi.
2.03 Expansion Joint Material
A. Expansion joint material shall be 3/4” thick wood fiber asphalt-impregnated material meeting the requirements specified in Section 03 31 11 CONCRETE STRUCTURES or as noted on the Drawings.
2.04 Backfill Material
A. Select Backfill Material
1. Shall be native on-site material from excavation, imported material, or a mixture of sand and clay or other suitable granular material free from vegetation, rocks, debris, and material that is in large clumps greater than two-inches (2”) meeting the following requirements:
a. Liquid limit of thirty-five (35) maximum,
b. Plasticity index range from eight (8) to twenty (20),
c. Moisture range from -1% to 3%.
2. This material shall not include soils with a Unified Soil Classification System of OL, MH, OH, CH, and PT or soils with an AASHTO classification of A7.
B. Topsoil Backfill Material
1. Suitable material chosen from the excavation may be used.
2. The material chosen shall be free of large lumps or clods, which will not readily break down under compaction.
3. This material will be subject to approval by the Owner.
4. Material shall be free of vegetation or other extraneous material.
5. Should be stockpiled separately and used for finish grading.
6. Capable of supporting a good growth of grass when fertilized and seeded or sodded.

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PART 3 - EXECUTION

3.01 General

A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.
B. Shall be placed in sections of the length indicated on the Drawings.
C. Each section shall be separated by an expansion joint of cross section specified for the curb and gutter and of the thickness indicated on the Drawings.
D. Provide machinery, tools, and equipment necessary for proper execution of the work.

3.02 Excavation and Subgrade

A. Excavation shall be shaped to line, grade per typical cross section, and hand tamped and sprinkled.
B. The subgrade shall be as shown on the Drawings.

3.03 Reinforcing Steel and Dowels

A. The reinforcing steel and Dowels shall be of type and placed in position as shown on the Drawings.
B. Care shall be exercised to keep all steel in its proper location.

3.04 Expansion Joints

A. Shall be constructed a maximum of 39’-0” on center or as noted on Drawings or as directed by Owner.
   1. If curb and gutter is attached to rigid concrete pavement than the expansion joints shall align with the expansion joints of the rigid concrete pavement, unless noted on the Drawings or directed by the Owner.
B. Joint shall be 3/4” and be filled with expansion joint material placed vertically and at right angles to the longitudinal axis of the curb and gutter.
C. Expansion material shall be placed around all obstructions protruding through the curb and gutter.
D. Dowels
   1. When required shall be extended across the joint nine-inches (9”) minimum and be sleeved or greased on one (1) end.

3.05 Control Joints

A. Shall be tooled at the time of concrete placement at 10’-0” on centers, or as noted on Drawings or directed by the Owner.
B. Shall be 1/2” depth by 1/8” width or as noted on Drawings or directed by Owner.

3.06 Concrete Placement

A. General
   1. Concrete for curb and gutter shall be mixed and placed in a manner satisfactory to the Owner.
   2. If dry, the foundation material shall be sprinkled lightly immediately before concrete is deposited thereon.
   3. After the concrete has been struck off and after it has become sufficiently set, the exposed surfaces shall be thoroughly worked with a wooden float.
   4. The exposed edges shall be rounded by the use of an edging tool to the radius indicated on Drawings.
   5. All exposed surfaces of curb and gutter, or curb, shall be brushed to a smooth and uniform surface.
B. Curing
   1. The completed curb and gutter shall be cured with Type 2, white pigmented, curing compound unless shown otherwise on Drawings.

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2. Other methods of curing as outlined in the specification, Section 03 31 11 CONCRETE STRUCTURES will be acceptable with a required curing period of 72 hours.

3.07 Formed Concrete

A. Forms
   1. General
      a. Forms will be required for all curb and gutter that is not Machine Laid.
   2. Outside Forms
      a. Shall be of wood or metal, of a section satisfactory to the Owner.
      b. Be straight, free of warp, and a depth equal to the depth of the curb and gutter.
      c. Shall be securely staked to line and grade, and maintained in a true position during the depositing of concrete.
      d. Shall conform to the specified radius when placed on curves.
   3. Inside Forms
      a. Shall be of wood or metal.
      b. Of a section satisfactory to the Owner.
      c. Be straight, free of warp, and a depth equal to the depth of the curb and gutter.
      d. Shall be securely staked to line and grade, and maintained in a true position during the depositing of concrete.
      e. Shall be rigidly attached to the outside forms.
      f. Shall conform to the specified radius when placed on curves.

3.08 Machine Laid

A. Can be used when approved by the Owner.
B. The machine weight shall be such that the required compaction is obtained without the machine riding above the bed on which curbing is constructed.
C. Shall form curb and gutter that are uniform in texture, shape, and density.
D. Forming tube of the extrusion machine or the form of the slip form machine must be easily adjustable vertically during the forward motion of the machine to provide variable heights necessary to conform to the established grade line.
E. A pointer, gauge, or other Owner approved method shall be attached to the machine so that a continual comparison can be made between the extruded or slip form work and the grade guideline.

3.09 Backfill

A. Sidewalk not Attached
   1. Material
      a. 6” Below Top Of Curb
         1) Select Backfill Material, unless otherwise noted on the Drawings or directed by the Owner.
      b. 6” Below Top Of Curb to Top of Curb
         1) Topsoil Backfill Material, unless otherwise noted on the Drawings or directed by the Owner.
   2. Placement
      a. Shall be placed in a manner as to not damage any work or existing structures.
      b. Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) two-feet (2’) beyond curb immediately after completion of concrete work.
      c. The placing of the material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
   3. Compaction
      a. General
         1) Shall be compacted in a manner as to not damage any work or existing structures.

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b. Select Backfill Material
1) Compacted by use of industry standard equipment at zero to five-percent (0-5%) of optimum moisture content to ninety-percent (90%) of maximum dry density determined according to ASTM D 698, or as required by the Drawings or Owner.
c. Topsoil Backfill Material
1) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench, or as required by the Drawings or Owner.
2) Compacted by use of industry standard equipment to a firm density, or as required by the Drawings or Owner.

B. Sidewalk Attached
1. Material
a. To bottom of Sidewalk Structure
1) Select Backfill Material, unless otherwise noted on the Drawings or directed by the Owner.
2. Placement
a. Shall be placed in a manner as to not damage any work or existing structures.
b. Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) full width of sidewalk immediately after completion of concrete work.
c. The placing of the material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
3. Compaction
a. General
1) Shall be compacted in a manner as to not damage any work or existing structures.
b. Select Backfill Material
1) Compacted by use of industry standard equipment at zero to five-percent (0-5%) of optimum moisture content to ninety-percent (90%) of maximum dry density determined according to ASTM D 698, or as required by the Drawings or Owner.

C. Driveway Attached
1. Material
a. To bottom of Driveway Structure
1) Select Backfill Material, unless otherwise noted on the Drawings or directed by the Owner.
2. Placement
a. Shall be placed in a manner as to not damage any work or existing structures.
b. Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) full width of driveway or to Right-of-Way line, whichever is greater, immediately after completion of concrete work.
c. The placing of the material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
3. Compaction
a. General
1) Shall be compacted in a manner as to not damage any work or existing structures.
b. Select Backfill Material
1) Compacted by use of industry standard equipment at zero to five-percent (0-5%) of optimum moisture content to ninety-percent (90%) of maximum dry

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density determined according to ASTM D 698, or as required by the Drawings or Owner.

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SECTION 32 16 23
SIDEWALKS

PART 1 - GENERAL

1.01 Description
A. This specification shall govern work required for the installation of Sidewalks as required to complete the project.

1.02 Related Sections
A. 03 31 11 CONCRETE STRUCTURES
B. 03 21 11 REINFORCING STEEL
C. 03 39 11 CONCRETE CURING

1.03 References *The latest edition of the referenced item below shall be used.*
A. Texas Administrative Code, Title 16, Part 4, Chapter 68, Rule §68.10
B. Texas Accessibility Standards
C. Department of Justice ADA Standards for Accessible Design

1.04 Submittals
A. Product Information
   1. Clearly indicate within submittal that the product is in compliance with this and related specification(s).

1.05 Definitions *The words defined in this section shall for the purpose of this specification have the meanings ascribed to them.*
A. ADA Standards – shall mean compliance with the Texas Accessibility Standards and the Department of Justice ADA Standards for Accessible Design

PART 2 - PRODUCTS

2.01 Concrete
A. Unless otherwise specified on Drawings, materials and proportions for concrete used in construction under this item shall conform the requirements as specified for Class "A" Concrete under specification, Section 03 31 11 CONCRETE STRUCTURES.
B. All concrete shall be Class A with a minimum 28 day strength of 3,000 psi.

2.02 Reinforcing Steel and Dowels
A. Reinforcing steel and Dowels, if required, shall conform to the requirements as specified in the Section 03 21 11 REINFORCING STEEL, or as noted on the Drawings.
B. All steel shall be Grade 60 with a minimum fy of 60,000 psi.

2.03 Concrete Curing
A. Shall be in accordance with Section 03 39 11 CONCRETE CURING.

2.04 Expansion Joint Material
A. Expansion joint material shall be in accordance with Section 03 31 11 CONCRETE STRUCTURES and as noted on the Drawings.

2.05 Detectable Surface
A. Unless otherwise stated, shall be in accordance with Texas Accessibility Standards for Detectable Warnings, Department of Justice ADA Standards for Accessible Design for Detectable Warnings, and the Drawings, otherwise specified by the Owner.

2.06 Pavement Markings
A. All stripping shall be in accordance with the standard details and specifications of the local governing entity.

2.07 Backfill Material
A. Select Backfill Material
   1. Shall be native on-site material from excavation, imported material, or a mixture of sand and clay or other suitable granular material free from vegetation, rocks, debris, and

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material that is in large clumps greater than two-inches (2”) meeting the following requirements:
   a. Liquid limit of thirty-five (35) maximum,
   b. Plasticity index range from eight (8) to twenty (20),
   c. Moisture range from -1% to 3%.
2. This material shall not include soils with a Unified Soil Classification System of OL, MH, OH, CH, and PT or soils with an AASHTO classification of A7.

B. Topsoil Backfill Material
1. Suitable material chosen from the excavation may be used.
2. The material chosen shall be free of large lumps or clods, which will not readily break down under compaction.
3. This material will be subject to approval by the Owner.
4. Material shall be free of vegetation or other extraneous material.
5. Should be stockpiled separately and used for finish grading.
6. Capable of supporting a good growth of grass when fertilized and seeded or sodded.

PART 3 - EXECUTION

3.01 General

A. All Work shall be in accordance with the Contract, Specifications, Drawings, Manufacturer recommendations, and industry standards.
1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.

B. Shall be constructed in sections of the lengths and widths shown on Drawings.
1. Unless otherwise provided by the Drawings, no section shall be a length less than eight-feet (8’).
2. Each section shall be separated by an expansion joint.

C. All work per day shall terminate at expansion joints.

D. Provide machinery, tools, and equipment necessary for proper execution of the work.

3.02 Excavation and Subgrade

A. Excavation shall be shaped to line, grade per typical cross section, and hand tamped and sprinkled.

B. The subgrade shall be compacted to 95% Standard Proctor or as shown on the Drawings.

3.03 Forms

A. General
1. Shall be in accordance with Section 03 11 13.11 CONCRETE FORMS
2. Opening in forms shall be provided, if needed, for the removal of laitance of foreign matter of any kind.
3. All forms shall be wetted thoroughly before the concrete is placed therein.
4. If, at any stage of the work, the forms show signs of bulging or sagging, the portion of the concrete causing such condition shall be removed immediately, if necessary, and the forms shall be reset and securely braced against further movement.

3.04 Reinforcing Steel and Dowels

A. The reinforcing steel and Dowels shall be of type and placed in position as shown on the Drawings.

B. Care shall be exercised to keep all steel in its proper location.

3.05 Expansion Joints

1. Shall be constructed a maximum of 39’-0” on center or as noted on Drawings or as directed by Owner.
   a. If attached to curb and gutter than the expansion joints shall align with the expansion joints of the curb and gutter, unless noted on the Drawings or directed by the Owner.

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2. Joint shall be 3/4” and be filled with expansion joint material placed vertically and at right angles to the longitudinal axis of the curb and gutter.
3. Where the sidewalk abuts a retaining wall, driveway, curb, or other hard surface expansion joint shall be placed along the entire length.
4. Expansion material shall be placed around all obstructions protruding through the sidewalk.
5. Dowels
   a. When required shall be extended across the joint nine-inch (9”) minimum and be sleeved or greased on one (1) end.
   b. When adjacent to existing curb and gutter or to existing sidewalk dowels shall be drilled into the existing concrete on eighteen-inch (18”) on centers.

3.06 Control Joints

1. Shall be tooled at the time of concrete placement at a maximum of 4’-0” on centers or evenly spaced between expansion joints, or as noted on Drawings or directed by the Owner.
2. Shall be 1/2” depth by 1/8” width or as noted on Drawings or directed by Owner.

3.07 Concrete Placement

A. Shall be in accordance with Section 03 31 11 CONCRETE STRUCTURES
B. The subgrade and reinforcement shall be moist at the time the concrete is placed.
C. Shall be placed in the forms to the depth specified and spaded and tamped until thoroughly compacted and mortar entirely covers the surface.
D. Subgrade shall be slightly moist at the time the concrete is placed.

3.08 Finishing

A. The top surface shall be floated with a float to a smooth gritty texture.
B. The outer edges and joints shall then be rounded with a one-half inch (1/2”) radius with approved tools or as shown on Drawings.
C. Surface Finish
   1. Shall be broom finish or as noted on the Drawings
      a. The surface shall be textured with a heavy broom finish perpendicular to the common travel way.
   2. Other Finish
      a. The surface shall be as noted on the Drawings or as directed by the Owner.

3.09 Curb Ramp with Detectable Surface

A. General
   1. Shall be installed in accordance with the Drawings and recommendations of the manufacturer.
   2. Properly constructed curb ramp shall be true to line, section, grade and shall be free of loose surfacing and irregularities.
   3. The subgrade shall be shaped to line, grade, cross section, and shall be of uniform density and moisture, when concrete is placed.
   4. The subgrade shall be hand tamped and sprinkled to achieve the desired consistency and uniform support.
   5. Unless shown otherwise on the Drawings, ramps shall have a minimum concrete thickness in excess of four-inches (4"), prior to application of textured surface.
B. Slope
   1. Slopes, S, shall be as shown in Table 1 unless shown otherwise on the Drawings:

Table 1
Required Slopes for Curb Ramps and Sidewalks

Ramp	Slope (S) [1]
Ramp in direction of travel	S ≤ 1:12

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Side slope of ramp (flare)	S ≤ 1:10
Cross Slope	1:100 ≤ S ≤ 1:50
Sidewalks	Slope (S) [1]
Landings adjacent to ramp	S ≤ 1:20
Driveways abutting tied sidewalk	S ≤ 1:10

[1] In all cases the slope shall be in accordance with ADA Standards

C. Width of ramp
   1. Shall be as shown on the Drawings.
D. Obstructions
   1. Shall be removed or relocated, as appropriate, or the location of the ramp may be shifted, if authorized.
E. Detectable Warning
   1. Surfacing shall be flush with abutting areas and placed using a template as required to achieve an esthetic well-defined edge.
   2. Perpendicular Curb Ramps
      a. Within the public right of way, detectable warnings complying with TAS 705 at a minimum of 24” in depth (in the direction of pedestrian travel) and extending the full width of the curb ramp shall be provided where the pedestrian access route enters a crosswalk or other hazardous vehicular area.
   3. Parallel Curb Ramps
      a. Within the public right-of-way, detectable warnings complying with TAS 705 at a minimum of 24” in depth (in the direction of pedestrian travel) and extending the full width of the landing shall be provided where the pedestrian access route enters a crosswalk or other hazardous vehicular area.
   4. Diagonal Curb Ramps
      a. Within the public right-of-way, detectable warnings complying with TAS 705 at a minimum of 24” in depth (in the direction of pedestrian travel) and extending the full width of the curb ramp or landing, shall be provided where the pedestrian access route enters a crosswalk or other hazardous vehicular area.
      b. The detectable warning shall be curved with the radius of the corner.
   5. The detectable warning shall be located so that the edge nearest the curb line is 6” minimum and 10” maximum from the curb line.
   6. Abutting curbs, sidewalks, gutters, driveways, etc. shall not receive textured surfacing.
F. Pavement Markings for Street Crossings
   1. Shall be placed such that the crosswalk is properly aligned with respect to the Curb Ramp. Curb ramp must be wholly contained within cross walk markings.
   2. Proper alignment of striping with respect to intersection and curb ramp shall be done in accordance with ADA Standards, and the Drawings.
   3. All stripping shall be in accordance with the standard details and specifications of the local governing entity.

3.10 Curing

A. Within twenty (20) minutes of the surface being textured the curing compound shall be applied.
B. Shall be as outlined in the Section 03 39 11 CONCRETE CURING will be acceptable with a required curing period of seventy-two (72) hours, unless shown otherwise on the Drawings.
C. Concrete must be protected from freezing temperatures for at least three (3) days.

3.11 Backfill and Grading

A. Material shall be the same or similar to the surrounding area which is free of stones and

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debris, or as directed by Owner.

B. Grading shall promote positive drainage.

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SECTION 32 31 00 – ORNAMENTAL CANTILEVER GATE SYSTEM

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The contractor shall provide all labor, materials, and appurtenances necessary for installation of the industrial ornamental cantilever gate system defined herein.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.
B. Section 32 31 19 - Ornamental Metal Fencing

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
B. ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.
C. ASTM D523 - Test Method for Specular Gloss.
D. ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.
E. ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
F. ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
G. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
H. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
I. ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.
J. ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this section; require attendance by affected installers.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings:
   1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

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D. Manufacturer's Warranty.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years experience.

B. Installer Qualifications: Experienced with type of construction involved and materials and techniques specified and approved by fence manufacturer.

1.07 DELIVERY, STORAGE AND HANDLING

A. Upon receipt at the job site, all materials shall be checked to ensure that no damages occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. All industrial ornamental cantilever gates shall conform to the (Basis of Design) Ameristar, TransPort Traverse II gate system, Classic design, as manufactured by Ameristar Perimeter Security USA Inc., in Tulsa, Oklahoma. The project gate schedule shall include the following additional information for each cantilever gate included in the project scope: 16 feet opening or 12 fee opening, 8 feet height, direction of gate travel to the open position, left or right (refer to drawings), viewing from outside fence line looking in gate travel direction.
   1. Elite Fence Products, Inc.: www.elitefence.com
   2. Fortress Fence Products: www.FortressFence.com
   3. Master-Halco, Inc.: www.fenceonline.com
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIAL

A. The materials used for cantilever gate framing (uprights & diagonal bracing) shall be manufactured from ASTM A653 Steel with yield strength of 34,800 PSI, a tensile strength of 37,700PSI and a standard mill finish. The TransPort™ aluminum extrusions for top and bottom enclosed tracks shall be alloy and temper designation 6005-T5 to meet ASTM B221.

B. Material for pickets shall be 1” square x 16 ga. steel pickets on gate systems less than 22’ openings, gate systems greater than 22’ openings shall have 1" square x 1/8” wall aluminum pickets. Picket on center spacing shall not exceed 5". Pickets shall be securely fastened to face of top and bottom enclosed track extrusions.

C. Material for gate uprights shall be 2 ½” X 16 ga. and diagonal bracing shall be 2” square x 16 ga. steel. The cross-sectional shape of the enclosed-track shall confirm to the manufacturers Traverse-Trak™ design with a single extrusion consisting of a 3.75” x 7” channeled support with integrated 3” x 3” enclosed-track raceway. Gates less than 18-foot openings shall be constructed as a single-track system, gates greater than 20-foot openings shall be constructed as a spliced track system.

D. Steel material for fence posts and pickets shall be galvanized prior to forming in accordance with the requirements of ASTM A653/A653M, with minimum yield strength of 45,000 psi (310 MPa). The

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steel shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 0.90 oz/ft2 (276 g/m2), Coating Designation G-90. Depending on application and gate size, material for gate support posts shall be 4” x 11 Ga., or 6” x 3/16”.

E. Support carriage trolly assemblies, for the gates enclosed bottom track, shall have two mounting options: concrete slab or post mount bracket configuration, and shall support the vertical load of the gate. The gates center of gravity shall be centered on the bottom support carriage trolly assemblies. Installation of the carriage trolly assemblies shall be per manufacturer’s installation instructions.

2.03 FABRICATION

A. Gate frame uprights and diagonal bracing shall be prefabricated and pre-punched to accept frame fasteners. Enclosed track shall be pre-punched to accept gate uprights. Pickets shall be precut to specified length and predrilled to accept picket to track fasteners. Posts shall be precut to specified lengths.

B. Top and bottom enclosed track extrusions shall be mechanically fastened to vertical gate uprights and intermediate supports, as required by assembly instructions. Diagonal bracing shall be mechanically fastened to vertical gate uprights and intermediate supports, as required by assembly instructions. Pickets shall be mechanically fastened to top and bottom enclosed track, as required by assembly instructions.

C. The manufactured gate components shall be subjected to the Ameristar thermal stratification coating process (high-temperature, in-line, multi-stage, and multi-layer) including, as a minimum, a six-stage pretreatment/wash and an electrostatic spray application of a polyester finish. The topcoat shall be a “no-mar” TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). The color shall be Black. The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Table 1.

PART 3 EXECUTION

3.01 PREPARATION

A. All new installation shall be laid out by the contractor in accordance with the construction plans.

3.02 GATE INSTALLATION

A. Cantilever support posts shall be set in concrete footers having a minimum depth of 48” (Note: In most cases, local soil, code restrictions and inclement weather conditions may require a greater depth). Posts shall be spaced according to gate specific submittal drawings. Optional Safety Kit must be included if the gate is automated. The “Concrete” section of this specification shall govern material requirements for the concrete footer.

3.03 GATE INSTALLATION MAINTENANCE

A. When cutting/drilling posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be

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used to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

3.04 GATE INSTALLATION

A. Gate posts shall be spaced according to the manufacturers' drawings, dependent on clear opening. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacture of the gate and shall be installed per manufacturer's recommendations.

3.05 CLEANING

A. The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

Table 1 – Coating Performance Requirements

Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654chart	Corrosion Resistance over 1,000 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).
Weathering Resistance	D822 D2244, D523 (60˚ Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

END OF SECTION 32 31 00

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SECTION 32 31 15 – VINYL-CLAD CHAIN LINK FENCING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide materials, equipment and labor to install vinyl clad chain link fencing, gates, and windscreen.

1.2 SUBMITTALS

A. Manufacturer's technical data for fences and gates.

B. Manufacturer's technical date for grounding.

C. Product Data: For each type of product.
   1. include construction details, material descriptions, dimension of individual components and profiles, and finishes for the following:
      a. Fence and gate posts, rails, and fittings.
      b. Chain-link fabric, reinforecments, and attachments.
      c. Accessories: Wind Screen.
      d. Gates and Hardware.

D. Shop Drawings: For each typ of fence and gate assembly.
   1. Include plans, elevations, sections, details, and attachments to other work.
   2. Include accessories, hardware, gate operation, and operational clearances.

E. Delegated Design Submittal: For structural performance of chain-link fence and gate frameworks, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 QUALITY ASSURANCE

A. Single-source Responsibility: Obtain chain link fences as complete units, including necessary erection accessories, fittings, and fastenings from a single source or manufacturer.

1.4 FIELD CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 EXAMPLES OF ACCEPTABLE MANUFACTURERS

A. Provide vinyl-clad chain link fences and gates as manufactured by one of the following:
   1. Allied Fence Manufacturing Co.
   2. Ameristar Fence Products
   3. Anchor Fence Div. Master-Halco, Inc.
   4. Merchants Metals

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5. Stephens Pipe & Steel

2.2 GENERAL

A. Pipe sizes indicated are commercial pipe sizes.

B. Tube sizes indicated are nominal outside dimension.

C. Roll-formed section sizes are the nominal outside dimensions.

D. Finish for framework and appurtenances shall be Black:
   1. Galvanized finishes shall have not less than the minimum weight of zinc per sq. ft., as indicated.
      a) Pipe: ASTM A53/F1083 (1.8 oz. zinc per square foot)
      b) Square tubing: ASTM A123 (2.0 oz. zinc per square foot)
      c) Roll formed from sheet: ASTM A123 (2.0 oz. zinc per square foot)
      d) Hardware and Accessories: ASTM A153 (zinc weight in accordance with Table I)

E. Chain Link Fences shall be color coated as follows:
   1. Fabric shall have a 15 mil extruded and adhered PVC coating meeting ASTM F668 Class 2A.
   2. Fittings, Caps, sleeves, and ties shall have a 6 mil minimum polymer coating
   3. Framework, Rails, Posts, Braces and Gates shall have 3 mil minimum polyester resin coating.
   4. Colors shall be Black.

2.3 MATERIALS AND CONSTRUCTION

A. Fabric: The chain link fabric shall be 9 gauge outside finish with 11 gauge galvanized steel core, vinyl clad both selvages knuckled. Color to be Black.

B. Top rail: 1⅝", vinyl clad. Color to be Black.

C. Terminal and Gate Posts: Terminal and Gate Posts shall be 4" O.D. steel round posts vinyl covered weighing 9.10 lbs. per lineal foot. These posts shall not be splice welded in such a manner the weld appears above the grade line.

D. Terminal and Gate Post Fittings: Terminal and gate post fittings including tension bands, brace connections and top rail connections shall be No. 11 gauge, hot-dipped galvanized, cold-rolled carbon steel vinyl covered. No aluminum, cast iron, or pot-metal will be accepted as equals or substitutes. Top rail, brace and truss bands shall be vinyl covered and not less than 3/4" wide, secured by 5/16" diameter vinyl covered carriage bolts. Tension bars shall be vinyl covered and not be less than 3/16" by 3/4" and not less than 2" shorter than the nominal height of the fabric with which they are to be used. One tension bar shall be provided for each end and gate post, and two for each corner and pull post.

E. Gates: Gate width is shown on drawings. Frames shall be constructed of 2" vinyl covered square members weighing 2.72 lbs. per lineal foot or alternately of TYPE I (See paragraph B) 1.900" O.D. round steel pipe weighing 2.72 lbs. per lineal foot or TYPE II (See paragraph B) 1.900" O.D. round steel pipe vinyl covered weighing 2.281 lbs. per lineal foot. Gate frames shall be welded or alternately shall utilize corner fittings of heavy malleable iron or pressed steel securely riveted to the frame. Fabric matching the fence fabric shall be installed in the fame by means of tension bars and hook bolts. Frames having corner fittings shall be equipped with adjustable truss rods having a diameter of 3/8". Hinges shall be of adequate strength to support the gate and have large bearing

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surfaces for clamping in position. Under no conditions of use or abuse shall the hinges twist or turn under the action of the gate. Gates shall be capable of being opened and closed quickly and easily by one person. Gates shall be equipped with a positive latching device that will accommodate padlocking. A plunger rod, catch and semi-automatic outer catch shall be installed on drive gates so as to secure gates in an open position. Hinges, latches and catches shall be one of the manufacturer's standard designs as selected and approved by the Architect.

F. Line posts and line post top: 4" vinyl clad. Color to be Black

G. Terminal posts and terminal post top: 4½" vinyl clad. Color to be Black.

H. Bottom cable: No. 7 gauge galvanized steel vinyl clad. Color to be Black.

I. Ties: 9 gauge aluminum vinyl clad. Color to be Black.

J. Concrete: Provide concrete consisting of Portland cement, ASTM C 150, aggregates ASTM C33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3000 psi..

F. Windscreen:
1. Black Polypropylene open mesh, 4.85oz, tensile strength 290/140 lbs, tear strength 127/70lbs, elongation 10/14% burst strength 358 lbs/in, puncture strength 100lbs, shading 87%, fabrication 3 ply reinforced hemlines.
(Basis of Design): Lath Leno windscreen by Puttermanathletics. 4834 S Oakley Ave Chicago, IL 60654
2. Height to be between the bottom rail and the mid rail.
3. Fasten with permanent black ties.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install fence in compliance with ASTM F 567. Do not begin installation and erection before final grading is completed.

B. Excavation: Drill/hand-excavate with post-hole digger, holes for posts in firm, compacted soil.
1. Excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.
2. Excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 48 inches below finish grade surface.

C. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space maximum 10 feet o.c. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

D. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.

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E. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 11-gage hog rings of same material and finish as fabric wire, spaced maximum 24 inches o.c.

F. Fabric: Leave approximately 1 inch between finish grade and bottom selvage. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

G. Tension or Stretcher Bars: Thread through or clamp to fabric 4 inches o.c., and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.

H. Tie Wires: Use U-shaped wire of proper length to secure fabric firmly to posts and rails with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.
   1. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.

I Windscreen: Do not stretch Screen until concrete footings have cured a minimum of 14 days.
   1. Install Screen in a continuous length along straight run of fencing to the maximum feasible length of screen material. Install on all sides except the viewing area. Refer to Drawings.
   2. Fasten Screen according to Top, Bottom rails and all posts. Attachment points to be spaced to prevent any sagging of Screen fabric at a maximum of 12”o.c.
   3. Fasten with permanent weather resistant black ties.

3.2 PROTECTION AND CLEAN UP

A. Clean Up: Clean up all excess materials and dispose off premises. All excess materials are to become the property of the Contractor and shall be removed from the site at his expense.

END OF SECTION 32 31 15

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SECTION 32 31 19 – ORNAMENTAL METAL FENCING

The Conditions of the Contract and applicable requirements of Division 01 govern this section.

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The contractor shall provide all labor, materials and appurtenances necessary for installation of the commercial ornamental steel fence system defined herein.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.
B. Section 32 31 00 - Ornamental Cantilever Gate System

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
B. ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.
C. ASTM D523 - Test Method for Specular Gloss.
D. ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.
E. ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
F. ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
G. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
H. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
I. ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.
J. ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this section; require attendance by affected installers.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings:
   1. Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

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D. Manufacturer's Warranty.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years experience.

B. Installer Qualifications: Experienced with type of construction involved and materials and techniques specified and approved by fence manufacturer.

1.07 DELIVERY, STORAGE AND HANDLING

A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

1.08 WARRANTY

A. All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 10 years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.

B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufactures warranty shall be guaranteed for five (5) years from date of original purchase.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Ornamental Metal Fences and Gates:
   1. (Basis of Design) Ameristar Aegis Plus, Classic fence and Majestic entrance gate (refer to drawings for locations) style as manufactured by Ameristar Fence Products, Inc. in Tulsa, Oklahoma: www.ameristarfence.com.
   2. Elite Fence Products: www.elitefence.com
   3. Fortress Fence Products: www.FortressFence.com
   4. Master-Halco, Inc.: www.fenceonline.com
   5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIAL

A. Steel material for fence framework (i.e. tubular pickets, rails and posts), when galvanized prior to forming, shall conform to the requirements of ASTM A924/A924M, with a minimum yield strength of 45,000 psi (310 MPa). The steel shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 0.60 oz/ft2 (276 g/m2), Coating Designation G-60.

B. Material for fence pickets shall be 3/4" square x 17 Ga. tubing. The cross-sectional shape of the rails shall conform to the manufacturer's ForeRunner™ double-wall design with outside cross-section dimensions of 1.50" square and a minimum thickness of 14 Ga. Picket holes in the ForeRunner rail shall be spaced 4.70" o.c. Picket retaining rods shall be 0.125" diameter galvanized

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steel. High quality PVC grommets shall be supplied to seal all picket-to-rail intersections. Fence posts and gateposts shall meet the minimum size requirements of Table 1.

2.03 FABRICATION

A. Pickets, rails and posts shall be pre-cut to specified lengths. ForeRunner rails shall be pre-punched to accept pickets.

B. Grommets shall be inserted into the pre-punched holes in the rails and pickets shall be inserted through the grommets so that pre-drilled picket holes align with the internal upper raceway of the ForeRunner rails (Note: This can best be accomplished by using an alignment template). Retaining rods shall be inserted into each ForeRunner rail so that they pass through the pre-drilled holes in each picket, thus completing the panel assembly.

C. The manufactured galvanized framework shall be subjected to the PermaCoat® thermal stratification coating process (high-temperature, in-line, multi-stage pretreatment/wash, an electrostatic spray application of any epoxy base, and a separate electrostatic spray application of a polyester finish. The base coast shall be a thermosetting epoxy powder coating (gray in color) with a minimum thickness of 2 mils (0.0508mm). The topcoat shall be a “no-mar” TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). The color shall be Black,. The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2.

D. Completed panels shall be capable of supporting a 400 lb. load (applied at midspan) without permanent deformation. Panels without rings shall be biasable to a 12.5% change in grade.

E. Swing gates shall be fabricated using 1.5” x 14ga. Forerunner double channel rail, 1.75” sq. x 14ga. gate ends, and 3/4” sq. x 17ga. pickets. Gates that exceed 6’ in width will have a 1.5” sq. x 14ga. intermediate upright. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding.

F. Pedestrian swing gates shall be self-closing, having a gate leaf no larger than 48” width. Integrated hinge-closer set (2 qty) shall be ADA compliant that shall include a variable speed and final snap adjustment with compact design (no greater than 5” x 6” footprint). Hinge-closer set (2 qty) shall be tested to a minimum of 500,000 cycles and capable of self-closing gates up to a maximum gate weight of 260 lbs. and maximum weight load capacity of 1,500 lbs. Hinge-closer device shall be externally mounted with tamper-resistant security fasteners, with full range of adjustability, horizontal (.5” - 1.375”) and vertical (0 - .5”). Maintenance free hinge-closer set shall be tested to operate in temperatures of negative 20 F to 200 F degrees, and swings to negative 2 degrees to ensure reliable final lock engagement.

PART 3 EXECUTION

3.01 PREPARATION

A. All new installation shall be laid out by the contractor in accordance with the construction plans.

3.02 FENCE INSTALLATION

A. Fence post shall be spaced according to Table 3, plus or minus ½”. For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade.

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Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 36" (Note: In some cases, local restrictions of freezing weather conditions may require a greater depth). The "Concrete" section of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application

3.03 FENCE INSTALLATION MAINTENANCE

A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

3.04 GATE INSTALLATION

A. Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacture of the gate and shall be installed per manufacturer's recommendations.

3.05 CLEANING

A. The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

Table 1 – Minimum Sizes for Aegis Plus Posts

Fence Posts	Panel Height
2-1/2" x 12 Ga.	Up to & Including 8' Height
3" x 12 Ga.	Over 8' Up to & Including 10' Height
4" x 11 Ga.	Over 10' Height

Gate Leaf	Gate Height			
	Up to & Including 6'	Over 6' Up to & Including 8'	Over 8' Up to & Including 10'	Over 12'
Up to 4'	2 1/2" x 12Ga.	3" x 12 Ga.	4" x 11 Ga.	4" x 11 Ga.
4'1" to 6'	3" x 12Ga.	3" x 12 Ga.	4" x 11 Ga.	4" x 11 Ga.
6'1" to 8'	4" x 11 Ga.	4" x 11 Ga.	6" x 3/16"	6" x 3/16"
8'1" to 10'	4" x 11 Ga.	6" x 3/16"	6" x 3/16"	6" x 3/16"
10'1" to 12'	6" x 3/16"	6" x 3/16"	6" x 3/16"	8" x 1/4"
12'1" to 16'	6" x 3/16"	6" x 3/16"	8" x 1/4"	8" x 1/4"

Table 2 – Coating Performance Requirements

Quality Characteristics	ASTM Test Method	Performance Requirements

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Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 3,500 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).
Weathering Resistance	D822 D2244, D523 (60˚ Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

Table 3 – Aegis Plus – Post Spacing By Bracket Type

Span			8' Nominal (92" Rail)					
Post Size	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"
Bracket Type	Commercial Universal Blvd. (BB311)		Commercial Line Blvd. (BB310)		Commercial Flat Mount (BB306)		Commercial Swivel (BB312)*	
Post Settings ± ½" O.C.	95-1/2"	96"	95-1/2"	96"	95-1/2"	96"	*97"	*97-1/2"
Span			6' Nominal (73.25" Rail)					
Post Size	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"
Bracket Type	Commercial Universal Blvd. (BB311)		Commercial Line Blvd. (BB310)		Commercial Flat Mount (BB306)		Commercial Swivel (BB312)*	
Post Settings ± ½" O.C.	76-3/4"	77-1/4"	76-3/4"	77-1/4"	76-3/4"	77-1/4"	*78-1/4"	*78-3/4"
*Note: When using BB304 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel.								

END OF SECTION 32 31 19

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SECTION 33 05 10
EXCAVATION AND BACKFILL FOR UTILITIES

PART 1 - GENERAL

1.01 Description

A. This specification shall govern all work required for the excavation and backfill of water utilities, wastewater utilities, and storm drainage utilities, as required to complete the project.

1.02 Related Sections

A. 03 31 11.13 CONCRETE STRUCTURES
B. 31 23 16.13 TRENCHING
C. 31 24 13.10 EMBANKMENT
D. 33 05 07 TRENCHLESS UTILITY INSTALLATION
E. 33 14 13 WATER UTILITY DISTRIBUTION PIPING
F. 33 31 13.13 WASTEWATER UTILITY PIPING

1.03 References *The latest edition of the referenced item below shall be used and obtained by the Contractor*

A. ASTM C 150 – Specification for Portland Cement
B. ASTM D 558 – Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures
C. ASTM D 698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))
D. ASTM D 2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
E. ASTM D 2922 – Standard Test Methods for Density of Soil and Soil-Aggregate in Place By Nuclear Methods (Shallow Depth)
F. Part 1926, Subpart P – Excavations, Trenching, and Shoring of the Occupational Safety and Health Administration (OSHA) Standards and Interpretations
G. Texas Code Chapter 756 Subchapter C – Trench Safety
H. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 421, Hydraulic Cement Concrete
I. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS–4610, Fly Ash
J. Texas Department of Transportation (TxDOT) Test Procedure Tex-106-E

1.04 Definitions *The words defined in this section shall for the purpose of the specification have the meanings ascribed to them.*

A. Final Backfill – Material located from the top of the Initial Backfill to a specified height and is horizontal from trench sidewall to opposite trench sidewall
B. Pipe Bedding – Material located from the top of the foundation to the bottom level line of the pipe and is horizontal from trench sidewall to opposite trench sidewall.
C. Initial Backfill – Material placed from the Pipe Bedding up to a determined level line above the top of pipe and is horizontal from trench sidewall to opposite trench sidewall.
D. Pipe Embedment – Backfill Material consisting of Pipe Bedding and Initial Backfill.
E. Pipe Foundation – Material located at the bottom of the trench and is horizontal from trench sidewall to opposite trench sidewall.

PART 2 - PRODUCTS

2.01 Class I Backfill Materials

A. Material shall be well-graded gravels, sands, gravel-sand mixture, with all meet the following requirements:

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1. Meet the requirements of ASTM D2487 for: GW, SW.
2. Gradation
   a. GW
      1) D_{60} / D_{10} – greater than four-percent (4%)
      2) 1-1/2" (37.5 mm) Sieve – one-hundred percent 100% passing
      3) No. 4 (4.75 mm) Sieve – less than 50% of coarse fraction passing
      4) No. 200 (0.075 mm) Sieve – less than or equal to five-percent (5%) passing
   b. SW
      1) D_{60} / D_{10} – greater than six-percent (6%)
      2) 1-1/2" (37.5 mm) Sieve – one-hundred percent 100% passing
      3) No. 4 (4.75 mm) Sieve – more than 50% of coarse fraction passing
      4) No. 200 (0.075 mm) Sieve – less than or equal to five-percent (5%) passing
3. Plasticity Index
   a. GW
      1) Non-plastic
   b. SW
      1) Non-plastic

2.02 Class II Backfill Materials

A. Material shall meet the following requirements:
   1. Meet the requirements of ASTM D2487 for: GM, GP, SM, SP, SP-SM, SW-SM, GP-GM, GW-GM.
   2. Gradation
      a. GP
         1) No. 4 (4.75 mm) Sieve – minimum 30% passing
         2) No. 200 (0.075 mm) Sieve – less than five-percent (5%) passing
      b. SP
         1) No. 4 (4.75 mm) Sieve – minimum 30% passing
         2) No. 200 (0.075 mm) Sieve – less than five-percent (5%) passing
      c. GP-GM, GW-GM, SP-SM, SW-SM
         1) No. 4 (4.75 mm) Sieve – minimum 30% passing
         2) No. 200 (0.075 mm) Sieve – between five-percent (5%) and twelve-percent (12%) passing
   3. Plasticity Index
      a. GP
         1) Non-plastic to 4
      b. SP
         1) Non-plastic to 4
      c. GP-GM, GW-GM, SP-SM, SW-SM
         1) Non-plastic to 4

2.03 Coarse Aggregate Backfill Material

A. Material shall be in accordance with TxDOT Item 421, Aggregate Grade 4 or 5.

2.04 Crushed Stone Backfill Material

A. Material shall be in accordance with TxDOT Item 421, Aggregate Grade 2, 3, or 4.

2.05 Flowable Fill Backfill Material

A. Cement
   1. Shall be Cement Portland cement in accordance with ASTM C 150, Type I.
B. Fly Ash
   1. Fly ash shall conform to the requirements of TxDOT DMS-4610.
C. Filler Aggregate
   1. Shall consist of sand, stone screenings, other granular material that is compatible with the other components.

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2. Shall be fine enough to stay in suspension to the extent required for proper flow without segregation and for minimal settlement.
3. Shall have a Plasticity Index (TxDOT Test Method Tex-106-E) less than 15 and shall conform to the following gradation:
   a. Percent passing Sieve No. 200 shall be 0% – 10%

D. Mixing Water
1. Shall be in accordance with Section 03 31 11 CONCRETE STRUCTURES.

E. Additives
1. Darafill® or approved other.

F. Strength
1. Shall be 100 – 300 psi minimum compressive strength at 28 days

2.06 Select Backfill Material

A. Shall be native on-site material from excavation, imported material, or a mixture of sand and clay or other suitable granular material free from vegetation, rocks, debris, and material that is in large clumps greater than two-inches (2”) meeting the following requirements:
1. Liquid limit of thirty-five (35) maximum,
2. Plasticity index range from eight (8) to twenty (20),
3. Moisture range from -1% to 3%.

B. This material shall not include soils with a Unified Soil Classification System of OL, MH, OH, CH, and PT or soils with an AASHTO classification of A7.

2.07 Sand Backfill Material

A. Sand
1. Gradation shall be as follows:
   a. Percent passing #4 sieve – 55 – 100
   b. Percent passing #10 sieve – 40 – 100
   c. Percent passing #40 sieve – 25 – 100
   d. Percent passing #200 sieve – 10 – 20
   e. Plasticity Index – Non-plastic to 4

2.08 Cement Stabilized Sand Backfill Material

A. Shall be a mixture of cement-stabilized sand containing a minimum of two (2) sacks of standard Type I Portland cement per cubic yard of sand.

B. Sand
1. Gradation shall be as follows:
   a. Percent passing #4 sieve – 55 - 100
   b. Percent passing #10 sieve – 40 - 100
   c. Percent passing #40 sieve – 25 - 100
   d. Percent passing #200 sieve – 10 - 20
   e. Plasticity Index – NP – 10

2.09 Native Backfill Material

A. Suitable material chosen from on-site excavation or imported may be used.
1. This material will be subject to approval by the Owner.

B. The material chosen shall be free of large lumps or clods, which will not readily break down under compaction.

C. This material will be subject to approval by the Owner.

D. Material shall be free of vegetation or other extraneous material.

2.10 Topsoil Backfill Material

A. Suitable material chosen from on-site excavation or imported may be used.
1. This material will be subject to approval by the Owner.

B. The material chosen shall be free of large lumps or clods, which will not readily break down under compaction.

C. Material shall be free of vegetation or other extraneous material.

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D. Should be stockpiled separately and used for finish grading.
E. Capable of supporting a good growth of grass when fertilized and seeded or sodded.

2.11 Other Backfill Materials

A. Other material of comparable featured and equal quality may be substituted for the above items with approval of the Owner.

PART 3 - EXECUTION

3.01 General Information

A. All Work shall be in accordance with the Contract, Specifications, Drawings, manufacturer recommendations, and industry standards.
   1. In the event that a requirement conflicts with another, the more stringent requirement shall be followed, unless directed otherwise by the Owner.
B. All surplus materials shall become the Contractors and disposal shall be in accordance with local, state, and federal regulations and will be the responsibility of the Contractor, unless otherwise noted on the Drawings or directed by the Owner.
C. All damages by excavating, either to surface or subsurface structures, shall be repaired or replaced by the Constructor at his own cost and expense to the requirements of the damaged items owner.

3.02 Safety Requirements

A. It is the responsibility of the Contractor to adhere to all safety procedures and requirements of local, state, and federal regulations.
B. If at any time a trench shall be required to perform the work then the requirements of Section 31 23 16.13 TRENCHING shall be required.
C. Any excavation that remains open after working hours shall be covered with a steel plate of sufficient thickness to support traffic.

3.03 Excavation

A. General
   1. Trenching
      a. Excavation shall be constructed in open cut trenches with vertical sides in accordance with Section 31 23 16.13 TRENCHING.
      b. The Contractor shall pile excavated material in a manner that will not endanger the work and will avoid obstructing sidewalks, driveways, power pole, drainage, streets, etc.
      c. The Contractor shall not have more the 200 feet of open trench left behind the trenching operation and no more than 500 feet of ditch behind the ditching machine that is not compacted as required by the Drawings and specification.
         1) No trench or excavation shall remain open after working hours, without prior authorization from the Owner.
      d. If, for whatever reason, the trench width at the top of pipe must exceed that width indicated in the bedding details, the Contractor shall modify bedding as required by the Owner to accommodate the additional load on the pipe.
         1) Excavation width shall not exceed the right-of-way width, easement width, or as indicated on the Drawings or by Owner.
      e. If quicksand, muck, or similar unstable material develop or is encountered during the excavation, the following procedure shall be used unless other methods are called for on the Drawings.
         1) If the unstable condition is a result of ground water, the Contractor, prior to additional excavation shall control it.
         2) After stable conditions have been achieved, unstable soil shall be removed or stabilized to a depth of:

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a) Two-feet (2') below the bottom of pipe for pipes two-feet (2') or more in height.
b) To a depth equal to the height of pipe, twelve-inches (12") minimum, for pipe less than two-feet (2') in height.
c) Such excavation shall be carried at least one-foot (1') beyond the horizontal limits of the structure on all sides.

3) All unstable soil removed shall be replaced with Coarse Aggregate Backfill Material, or approved suitable stable material, placed in uniform layers of suitable depth as directed by the Owner, and each layer shall be wetted, if necessary, and compacted by mechanical tamping as required to provide a stable condition.
4) For unstable trench conditions requiring outside forms, seals, sheathing, and bracing, any additional excavation and backfill required shall be done at the Contractor's expense.
a) The limit of excavation may be modified to allow for placing and removing forms, installing sheeting, shoring, bracing, etc.

2. Trenchless
a. Shall be done in accordance with Section 33 05 07 TRENCHLESS UTILITY INSTALLATION
3. For all utilities to be constructed in fill above natural ground, the embankment shall first be constructed to an elevation not less than one-foot (1') above the top of the pipe or conduit in accordance with Section 31 24 13.10 EMBANKMENT, after which excavation for the pipe or conduit shall be made.

B. Pipes
1. General
a. The limit of excavation shall allow for all work to be performed in a safe manner, for placing and removing forms, installing sheeting, shoring, bracing, etc.
b. Trenches shall have a maximum width as required to one-foot (1') above the outside surface of the pipe and parallel thereto on each side unless otherwise specified on the Drawings or by the Owner.
2. Vertical Side
a. The limit shall not exceed three-feet (3') outside the Pipe Embedment on a vertical plane parallel to the Pipe Embedment except where specifically approved otherwise by the Owner.
b. The Contractor shall provide and install any sheeting, shoring, and bracing as necessary to provide a safe work area as required to protect workmen, structures, equipment, other improvements and utilities, etc.
c. The Contractor shall be solely responsible for all trench protection.
d. The sheeting, shoring, and bracing shall be removed, as the excavation is backfilled in a safe manner.
3. Sloping Sides
a. In unimproved areas, where sufficient space is available, the Contractor shall be allowed to back slope the sides of the excavation as long as it is completed in a safe manner in accordance with all Local, State, and Federal regulations.
1) Backfill material will be required to be in accordance with the backfill for the pipe installed.
4. Unauthorized Over Excavation
a. In the event the excavation is carried on below the indicated elevation, the Contractor at his expense shall bring the grade back to requirements by filling with Pipe Embedment Backfill material as required, unless otherwise noted on the Drawings or directed by the Owner.

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C. Manholes and Inlets
   1. General
      a. The limit of excavation shall allow for all work to be performed in a safe manner, for placing and removing forms, installing sheeting, shoring, bracing, etc.
   2. Vertical Side
      a. The limit shall not exceed three-feet (3') outside the footing on a vertical plane parallel to the footing except where specifically approved otherwise by the Owner.
      b. The Contractor shall provide and install any sheeting, shoring, and bracing as necessary to provide a safe work area as required to protect workmen, structures, equipment, other improvements and utilities, etc.
      c. The Contractor shall be solely responsible for all trench protection.
      d. The sheeting, shoring, and bracing shall be removed, as the excavation is backfilled in a safe manner.
   3. Sloping Sides
      a. In unimproved areas, where sufficient space is available, the Contractor shall be allowed to back slope the sides of the excavation as long as it is completed in a safe manner in accordance with all Local, State, and Federal regulations.
         1) Backfill material will be required to be in accordance with the backfill for the pipe installed.
   4. Unauthorized Over Excavation
      a. Excavation for slabs, footings, etc., that rest on earth, shall not be carried below the elevation shown on the Drawings.
         1) In the event the excavation is carried on below the indicated elevation, the Contractor at his expense shall bring the slab, footing, etc., to the required grade by filling with concrete with a minimum compressive strength of 4,000 psi, unless otherwise noted on the Drawings or directed by the Owner.

D. Shaping of Trench Bottom
   1. The trench bottom shall be undercut a minimum depth sufficient to accommodate the class of bedding indicated in the Drawings and Specifications.

E. De-watering
   1. The Contractor shall keep the excavation free from water by use of cofferdams, bailing, pumping well pointing, or any combination as the particular situation may warrant.
      a. Removal of well-points shall be at rate of 1/3 per 24 hours (every third well-point).
   2. All de-watering devices shall be installed in such a manner as to provide clearance for construction, removal of forms, and inspection of exterior of formwork.
   3. It is the intent of these specifications that the foundation be placed on a firm dry bed.
   4. The foundation bed shall be kept in a de-watered condition for a sufficient period of time to insure the safety of the structure, but in no case shall de-watering be terminated sooner than seven (7) days after placing concrete.
   5. All de-watering methods and procedures are subject to the approval of the Owner.
   6. The excavation shall be inspected and approved by the Owner before work on the structure is started.
   7. The Contractor shall provide a relatively smooth, firm foundation bed for footings and slabs that bear directly on the undisturbed earth without additional cost to the Owner, regardless of the soil conditions encountered.
      a. The Owner will be the sole judge as to whether these conditions have been met.

F. Excavation in Streets
   1. Excavation in streets, together with the maintenance of traffic where specified, and the restoration of the pavement riding surface shall be in accordance with Drawing detail, or as required by other applicable specifications.

G. Removing Abandoned Structures

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1. When abandoned masonry structures or foundations are encountered in the excavation, such obstructions shall be removed for the full width of the trench and to a depth of one foot (1') below the bottom of the trench.
2. When abandoned inlets or manholes are encountered and no Drawing provision is made for adjustment or connection to the new utility, such manholes and inlets shall be removed completely to a depth one-foot (1') below the bottom of the trench.
3. In each instance, the bottom to the trench shall be restored to grade by backfilling and compacting by the methods provided hereinafter for backfill.
4. Where the trench cuts through utility lines which are known to be abandoned, these sewers shall be cut flush with sides of the trench and blocked with a concrete plug in a manner satisfactory to the Owner.

H. Protection of Utilities
1. The Contractor shall inform utility owners sufficiently in advance of the Contractor's operations to enable such utility owners to reroute, provide temporary detours, or to make other adjustments to utility lines in order that the Contractor may proceed with his work with a minimum of delay.
2. The Contractor shall conduct his work such that a reasonable minimum of disturbance to existing utilities will result.
3. If a utility is damaged it shall be restored promptly by the Contractor at his expense in accordance with the utility owners requirements.
4. The Contractor shall not hold the Owner liable for any expense due to delay or additional work because of utility adjustments or conflicts.

I. Excess Excavated Material
1. All materials from excavation not required for backfilling the trench shall be removed, by the Contractor, from the job site promptly following the completion of work involved, or incorporated into the project.

3.04 Water Utilities Backfill

A. Main Piping and Accessories
1. Pipe Foundation
   a. Shall be firm and undisturbed native material, or as required by the Drawings or Owner.
   b. If disturbed it shall be compacted to same density as the native surrounding material.
2. Pipe Embedment Backfill
   a. General
      1) All pipe and fittings that are not enclosed in concrete valve boxes, laid in encasement pipe, shall be completely embedded as specified.
         a) This embedment includes the bottom, sides and top of pipe and fittings including bells, so that all portions will be encased to insulate the pipe from the natural ground and from the backfill.
      2) All trenches and excavation shall be backfilled as soon as is practical after the pipes and accessories are properly placed.
      3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
      4) Flooding or jetting of backfill is not allowed.
      5) Care shall be taken to not damage the tracer wire or cause wire to come off of pipe.
   b. Pipes 6" to 14"
      1) Material
         a) Shall be Sand Backfill Material, or as required by the Drawings or Owner.
      2) Pipe Bedding

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a) Eight-inches (8”) below the bottom of pipe and the total width of the trench, or as required by the Drawings or Owner.
b) In order to reduce the amount of material required, the trench bottom may be excavated in a rounded manner so as to maintain at least a minimum of twelve-inches (12”) of embedment material between the excavation sides and the pipe.

3) Initial Backfill
a) Twelve-inches (12”) above the top of pipe and the total width of the trench, or as required by the Drawings or Owner.

c. Pipes 16” and Larger
1) Material
a) Shall be Sand Backfill Material, or as required by the Drawings or Owner.
2) Pipe Bedding
a) Twelve-inches (12”) below the bottom of pipe and the total width of the trench, or as required by the Drawings or Owner.
b) In order to reduce the amount of material required, the trench bottom may be excavated in a rounded manner so as to maintain at least a minimum of twelve-inches (12”) of embedment material between the excavation sides and the pipe.
3) Initial Backfill
a) Twelve-inches (12”) above the top of pipe and the total width of the trench, or as required by the Drawings or Owner.

d. Placement
1) Shall be placed in a manner as to not damage any utility or improvements.
2) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

e. Compaction
1) General
a) Shall be compacted in a manner as to not damage any utility or improvements.
2) Sand Backfill Material
a) Hand tamp with tamping plate or other approved method at a moisture content determined by the Contractor for effective compaction without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

3. Warning Tape
a. Shall be placed as required in Section 33 14 13 WATER UTILITY DISTRIBUTION PIPING

4. Final Backfill
a. General
1) All trenches and excavation shall be backfilled as soon as is practical after the embedment and accessories have been properly placed.
2) The placing of the material shall be done in such a manner so as to be free of all foreign matter.
3) Flooding or jetting of backfill is not allowed.

b. Material
1) Paved Areas
a) Top of Pipe Embedment Material to the bottom of road subgrade material
(1) Select Backfill Material, or as required by the Drawings or Owner.

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2) Non-Paved Areas
a) Top of Pipe Embedment Material to six-inches (6”) below finished grade
(1) Native Backfill Material, or as required by the Drawings or Owner.
b) Top six-inches (6”)
(1) Topsoil Backfill Material, or as required by the Drawings or Owner.

c. Placement
1) Shall be placed in a manner as to not damage any utility or improvements.
2) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

d. Compaction
1) General
a) Shall be compacted in a manner as to not damage any utility or improvements.
2) Select Backfill Material
a) Compacted by use of industry standard equipment at zero to five-percent (0-5%) of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 698, or as required by the Drawings or Owner.
3) Native Backfill Material
a) Compacted by use of industry standard equipment to ninety-percent (90%) Standard Proctor, or as required by the Drawings or Owner.
4) Topsoil Backfill Material
a) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench, or as required by the Drawings or Owner.
b) Compacted by use of industry standard equipment to a firm density, or as required by the Drawings or Owner.

5. Utility Crossings
a. Outside of the pipes are within two-feet (2’) of each other
1) Material
a) Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
2) Encasement Requirement
a) Below Pipe
(1) As required in previous parts of this section, or as required by the Drawings or Owner.
b) Sides of Pipe
(1) As required in previous parts of this section, or as required by the Drawings or Owner.
c) Above Pipe
(1) As required in previous parts of this section, or as required by the Drawings or Owner.
d) Distance beyond crossing
(1) Three-feet (3’) or as required by the Drawings, owner of utility(ies), or Owner.
3) Placement
a) Shall be placed in a manner as to not damage any utility or improvements.
b) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.

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c) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

4) Compaction

a) Shall be compacted in a manner as to not damage any utility or improvements.

b) Material shall be placed and be compacted under, around the side, and over the utility(ies) in a manner that will reduce damage and settlement to a minimum or as approved by the Owner.

c) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

b. Outside of the pipes are beyond two-feet (2') of each other

1) Shall be as required for Main Piping and Accessories, or as required by the Drawings, owner of utility(ies), or Owner.

6. Compaction Testing

a. Frequency of tests shall not be less than one (1) for any pipe section between main line valves and every one-hundred linear feet (100') of main pipe per two-feet (2') vertical of backfill material to top of Final Backfill, not including Topsoil Backfill Material, starting at two feet (2') above top of pipe, in accordance with ASTM D 2922.

b. Failure

1) If compaction of the fill material does not meet or exceed the requirements that portion of fill material is to be further compacted and retested at the sole expense of the Contractor.

B. Service Lines

1. Pipe Foundation

a. Shall be firm and undisturbed native material, or as required by the Drawings or Owner.

b. If disturbed it shall be compacted to same density as the native surrounding material.

2. Pipe Embedment Backfill

a. General

1) All pipe and fittings that are not laid in encasement pipe, shall be completely embedded as specified.

a) This embedment includes the bottom, sides and top of pipe and fittings including bells, so that all portions will be encased to insulate the pipe from the natural ground and from the backfill.

2) All trenches and excavation shall be backfilled as soon as is practical after the pipes and accessories are properly placed.

3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

4) Flooding or jetting of backfill is not allowed.

b. Pipes up to 2"

1) Material

a) Shall be Select Backfill Material, or as required by the Drawings or Owner.

2) Pipe Bedding

a) Six-inches (6") below the bottom of pipe and the total width of the trench, or as required by the Drawings or Owner.

b) In order to reduce the amount of material required, the trench bottom may

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be excavated in a rounded manner so as to maintain at least a minimum of six-inches (6”) of embedment material between the excavation sides and the pipe.

3) Initial Backfill
   a) Six-inches (6”) above the top of pipe and the total width of the trench, or as required by the Drawings or Owner.

c. Pipes Larger Than 2”
   a) Shall be considered Main Piping and be in accordance with Section A of the Water Utilities Backfill in this specification.

d. Placement
   1) Shall be placed in a manner as to not damage any utility or improvements.
   2) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
   3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

e. Compaction
   1) General
      a) Shall be compacted in a manner as to not damage any utility or improvements.
   2) Sand Backfill Material
      a) Hand tamp with tamping plate or other approved method at a moisture content determined by the Contractor for effective compaction without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

3. Final Backfill
   a. General
      1) All trenches and excavation shall be backfilled as soon as is practical after the embedment and accessories have been properly placed.
      2) The placing of the material shall be done in such a manner so as to be free of all foreign matter.
      3) Flooding or jetting of backfill is not allowed.
   b. Material
      1) Shall be Native Backfill Material, or as required by the Drawings or Owner.
   c. Placement
      1) Shall be placed in a manner as to not damage any utility or improvements.
      2) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
      3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
   d. Compaction
      1) General
         a) Shall be compacted in a manner as to not damage any utility or improvements.
      2) Native Backfill Material
         a) Compacted by use of industry standard equipment to ninety-percent (90%) Standard Proctor, or as required by the Drawings or Owner.
      3) Topsoil Backfill Material
         a) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench, or as required by the Drawings or Owner.
         b) Compacted by use of industry standard equipment to a firm density, or as

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required by the Drawings or Owner.

4. Compaction Testing
   a. Are to be tested at a rate of one (1) for every six (6) services staggered or every three-hundred linear feet (300') of water service installed.

3.05 Wastewater Utilities Backfill

A. Main Piping and Accessories
   1. Pipe Foundation
      a. Shall be firm and undisturbed native material, or as required by the Drawings or Owner.
      b. If disturbed it shall be compacted to same density as the native surrounding material.
   2. Pipe Embedment Backfill
      a. General
         1) All pipe and fittings that are not laid in encasement pipe, shall be completely embedded as specified.
            a) This embedment includes the bottom, sides and top of pipe and fittings including bells, so that all portions will be encased to insulate the pipe from the natural ground and from the backfill.
         2) All trenches and excavation shall be backfilled as soon as is practical after the pipes and accessories are properly placed.
         3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
         4) Flooding or jetting of backfill is not allowed.
      b. Pipes 6" to 14"
         1) Material
            a) Excavation less than twenty-feet (<20') in depth and above groundwater table:
               (1) Shall be Class I Backfill Material, Class II Backfill Material, Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
            b) Excavation greater than twenty-feet (>20') in depth and below groundwater table:
               (1) Shall be Coarse Aggregate Backfill Material, or as required by the Drawings or Owner.
         2) Pipe Bedding
            a) Six-inches (6") below the bottom of pipe and the total width of the trench, or as required by the Drawings or Owner.
            b) In order to reduce the amount of material required, the trench bottom may be excavated in a rounded manner so as to maintain at least a minimum of twelve-inches (12") of embedment material between the excavation sides and the pipe.
         3) Initial Backfill
            a) Twelve-inches (12") above the top of pipe and the total width of the trench, or as required by the Drawings or Owner.
      c. Pipes 16" and Larger
         1) Material
            a) Excavation less than twenty-feet (<20') in depth and above groundwater table:
               (1) Shall be Class I Backfill Material, Class II Backfill Material, Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.

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b) Excavation greater than twenty-feet (>20') in depth and below groundwater table:
(1) Shall be Coarse Aggregate Backfill Material, or as required by the Drawings or Owner.

2) Pipe Bedding
a) Twelve-inches (12") below the bottom of pipe and the total width of the trench, or as required by the Drawings or Owner.
b) In order to reduce the amount of material required, the trench bottom may be excavated in a rounded manner so as to maintain at least a minimum of twelve-inches (12") of embedment material between the excavation sides and the pipe.

3) Initial Backfill
a) Twelve-inches (12") above the top of pipe and the total width of the trench, or as required by the Drawings or Owner.

d. Placement
1) Shall be placed in a manner as to not damage any utility or improvements.
2) Shall be placed in layers not more than eight-inches (8") in depth (loose measurement) the total width of the trench.
3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

e. Compaction
1) General
a) Shall be compacted in a manner as to not damage any utility or improvements.

2) Class I Backfill Material
a) Hand tamp with tamping plate or other approved method at a moisture content determined by the Contractor for effective compaction without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

3) Class II Backfill Material
a) Hand tamp with tamping plate or other approved method at three-percent (3%) of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 698 without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

4) Cement Stabilized Sand Backfill Material
a) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

5) Coarse Aggregate Backfill Material
a) Hand tamp with tamping plate or other approved method for effective compaction, or as required by the Drawings or Owner.

3. Warning Tape
a. Ductile Iron Pipe
1) Shall be placed as required in Section 33 14 13 WATER UTILITY DISTRIBUTION PIPING

b. Plastic Pipe
1) Shall be placed as required in Section 33 31 13.13 WASTEWATER UTILITY PIPING

4. Final Backfill

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a. General
    1) All trenches and excavation shall be backfilled as soon as is practical after the embedment and accessories have been properly placed.
    2) The placing of the material shall be done in such a manner so as to be free of all foreign matter.
    3) Flooding or jetting of backfill is not allowed.
b. Material
    1) Paved Areas
        a) Top of Embedment Material to three-feet (3') below the bottom of road subgrade material
            (1) Select Backfill Material, or as required by the Drawings or Owner.
        b) Three-feet (3') below the bottom of road base material to the bottom of the road subgrade material
            (1) Cement Stabilized Sand Backfill Material.
    2) Non-Paved Areas
        a) Top of Embedment Material to six-inches (6") below finished grade
            (1) Native Backfill Material, or as required by the Drawings or Owner.
        b) Top six-inches (6")
            (1) Topsoil Backfill Material, or as required by the Drawings or Owner.
c. Placement
    1) Shall be placed in a manner as to not damage any utility or improvements.
    2) Shall be placed in layers not more than eight-inches (8") in depth (loose measurement) the total width of the trench.
    3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
d. Compaction
    1) General
        a) Shall be compacted in a manner as to not damage any utility or improvements.
    2) Select Backfill Material
        a) Compacted by use of industry standard equipment at zero to five-percent (0-5%) of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 698, or as required by the Drawings or Owner.
    3) Cement Stabilized Sand Backfill Material
        a) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
    4) Native Backfill Material
        a) Compacted by use of industry standard equipment to ninety-percent (90%) Standard Proctor, or as required by the Drawings or Owner.
    5) Topsoil Backfill Material
        a) Shall be placed in layers not more than eight-inches (8") in depth (loose measurement) the total width of the trench, or as required by the Drawings or Owner.
        b) Compacted by use of industry standard equipment to a firm density, or as required by the Drawings or Owner.

5. Utility Crossings
    a. Outside of the pipes are within two-feet (2') of each other

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1) Material
   a) Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
2) Encasement Requirement
   a) Below Pipe
      (1) As required in previous parts of this section, or as required by the Drawings or Owner.
   b) Sides of Pipe
      (1) As required in previous parts of this section, or as required by the Drawings or Owner.
   c) Above Pipe
      (1) As required in previous parts of this section, or as required by the Drawings or Owner.
   d) Distance beyond crossing
      (1) Three-feet (3') or as required by the Drawings, owner of utility(ies), or Owner.
3) Placement
   a) Shall be placed in a manner as to not damage any utility.
   b) Shall be placed in layers not more than eight-inches (8") in depth (loose measurement) the total width of the trench.
   c) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
4) Compaction
   a) Shall be compacted in a manner as to not damage any utility.
   b) Material shall be placed and be compacted under, around the side, and over the utility(ies) in a manner that will reduce damage and settlement to a minimum or as approved by the Owner.
   c) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

b. Outside of the pipes are beyond two-feet (2') of each other
   1) Shall be as required for Main Piping and Accessories, or as required by the Drawings, owner of utility(ies), or Owner.

6. Compaction Testing
   a. Frequency of tests shall not be less than one (1) for any pipe section between manholes and every one-hundred linear feet (100') of main pipe per two-feet (2') vertical of backfill material to top of Final Backfill, not including Topsoil Backfill Material, starting at two feet (2') above top of pipe, in accordance with ASTM D 2922.
   b. Failure
      1) If compaction of the fill material does not meet or exceed the requirements that portion of fill material is to be further compacted and retested at the sole expense of the Contractor.

B. Service Lines
   1. Pipe Foundation
      a. Shall be firm and undisturbed native material, or as required by the Drawings or Owner.
      b. If disturbed it shall be compacted to same density as the native surrounding material.

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2. Pipe Embedment Backfill
   a. General
      1) All pipe and fittings that are not laid in encasement pipe, shall be completely embedded as specified.
         a) This embedment includes the bottom, sides and top of pipe and fittings including bells, so that all portions will be encased to insulate the pipe from the natural ground and from the backfill.
      2) All trenches and excavation shall be backfilled as soon as is practical after the pipes and accessories are properly placed.
      3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
      4) Flooding or jetting of backfill is not allowed.
   b. Pipes 4” to 6”
      1) Material
         a) Excavation less than twenty-feet (<20’) in depth and above groundwater table:
            (1) Shall be Sand Backfill Material, or as required by the Drawings or Owner.
         b) Excavation greater than twenty-feet (>20’) in depth and below groundwater table:
            (1) Shall be Coarse Aggregate Backfill Material, or as required by the Drawings or Owner.
      2) Pipe Bedding
         a) Six-inches (6”) below the bottom of pipe and the total width of the trench, or as required by the Drawings or Owner.
         b) In order to reduce the amount of material required, the trench bottom may be excavated in a rounded manner so as to maintain at least a minimum of six-inches (6”) of embedment material between the excavation sides and the pipe.
      3) Initial Backfill
         a) Six-inches (6”) above the top of pipe and the total width of the trench, or as required by the Drawings or Owner.
   c. Pipes Larger Than 6”
      a) Shall be considered Main Piping and be in accordance with Section A of the Wastewater Utilities Backfill in this specification.
   d. Placement
      1) Shall be placed in a manner as to not damage any utility or improvements.
      2) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
      3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
   e. Compaction
      1) General
         a) Shall be compacted in a manner as to not damage any utility or improvements.
      2) Sand Backfill Material
         a) Hand tamp with tamping plate or other approved method at a moisture content determined by the Contractor for effective compaction without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
      3) Coarse Aggregate Backfill Material

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a) Hand tamp with tamping plate or other approved method for effective compaction, or as required by the Drawings or Owner.

3. Final Backfill
   a. General
      1) All trenches and excavation shall be backfilled as soon as is practical after the embedment and accessories have been properly placed.
      2) The placing of the material shall be done in such a manner so as to be free of all foreign matter.
      3) Flooding or jetting of backfill is not allowed.
   b. Material
      1) Shall be Native Backfill Material, or as required by the Drawings or Owner.
   c. Placement
      1) Shall be placed in a manner as to not damage any utility.
      2) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
      3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
   d. Compaction
      1) General
         a) Shall be compacted in a manner as to not damage any utility.
      2) Native Backfill Material
         a) Compacted by use of industry standard equipment to ninety-percent (90%) Standard Proctor, or as required by the Drawings or Owner.
4. Utility Crossings
   a. Outside of the pipes are within two-feet (2’) of each other
      1) Material
         a) Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
      2) Encasement Requirement
         a) Below Pipe
            (1) As required in previous parts of this section, or as required by the Drawings or Owner.
         b) Sides of Pipe
            (1) As required in previous parts of this section, or as required by the Drawings or Owner.
         c) Above Pipe
            (1) As required in previous parts of this section, or as required by the Drawings or Owner.
         d) Distance beyond crossing
            (1) Three-feet (3’) or as required by the Drawings, owner of utility(ies), or Owner.
      3) Placement
         a) Shall be placed in a manner as to not damage any utility or improvements.
         b) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
         c) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
      4) Compaction
         a) Shall be compacted in a manner as to not damage any utility or improvements.

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b) Material shall be placed and be compacted under, around the side, and over the utility(ies) in a manner that will reduce damage and settlement to a minimum or as approved by the Owner.
c) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

b. Outside of the pipes are beyond two-feet (2') of each other
1) Shall be as required for Main Piping and Accessories, or as required by the Drawings, owner of utility(ies), or Owner.

5. Compaction Testing
6. Are to be tested at a rate of one (1) for every six (6) services staggered or every three-hundred linear feet (300') of wastewater service installed in accordance with ASTM D 2922.

C. Manhole
A. Schedule of Backfilling
1. Backfilling around the manholes shall commence as soon as concrete or masonry has been allowed to cure the required time and forms and shoring have been removed.

B. Subgrade
1. Shall be undisturbed native material, or as required by the Drawings or Owner.
2. Compact top six-inches (6") to 95% Standard Proctor Density.

C. Bedding
1. General
a. The placing of the backfill material shall be done in such a manner so as to be free of all natural soil or other foreign matter and prevent damage to any other work.

2. Material
a. Crushed Stone Backfill Material, or as required by the Drawings or Owner.

3. Requirement
a. Below Foundation
(1) Eight-inches (8") , or as required by the Drawings or Owner
b. Width
(1) Foundation width plus two-feet (2') or to edge of excavation whichever is greater.

4. Placement
a. Compact to form a stable surface to place foundation upon, or as required by the Drawings or Owner.

D. Initial Backfill
1. General
a. The placing of the material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter and prevent damage to any other work.

2. Material
a. Excavation less than twenty-feet (<20') in depth and above groundwater table:
(1) Shall be Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
b. Excavation greater than twenty-feet (>20') in depth and below groundwater table:
(1) Shall be Flowable Fill Backfill Material, or as required by the Drawings or

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Owner.
(2) Allow to cure prior to placement of Final Backfill
3. Requirement
a. Above Bedding
(1) Five-feet (5’), or as required by the Drawings or Owner
b. Width
(1) To extent of excavation.
4. Placement
a. Shall be placed in a manner as to not damage any utility.
b. Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
c. The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
5. Compaction
a. General
(1) Shall be compacted in a manner as to not damage any utility.
b. Crushed Stone Backfill Material
(1) Hand tamp with tamping plate or other approved method for effective compaction, or as required by the Drawings or Owner.

E. Final Backfill
1. General
a. All trenches and excavation shall be backfilled as soon as is practical after the embedment and accessories have been properly placed.
b. The placing of the material shall be done in such a manner so as to be free of all foreign matter.
c. Flooding or jetting of backfill is not allowed.
2. Material
a. Paved Areas
(1) Top of Initial Backfill to the bottom of road subgrade material
(a) Cement Stabilized Backfill Material, or as required by the Drawings or Owner.
b. Non-Paved Areas
(1) Top of Embedment Material to six-inches (6”) below finished grade
(a) Select Backfill Material, or as required by the Drawings or Owner.
(2) Top six-inches (6”)
(a) Topsoil Backfill Material, or as required by the Drawings or Owner.
3. Placement
a. Shall be placed in a manner as to not damage any utility or improvements.
b. Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
c. The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
4. Compaction
a. General
(1) Shall be compacted in a manner as to not damage any utility or improvements.
b. Select Backfill Material
(1) Compacted by use of industry standard equipment at zero to five-percent (0-5%) of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 698, or as required by the Drawings or Owner.

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c. Cement Stabilized Sand Backfill Material
(1) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
d. Topsoil Backfill Material
(1) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench, or as required by the Drawings or Owner.
(2) Compacted by use of industry standard equipment to a firm density, or as required by the Drawings or Owner.

F. Compaction Testing
1. Frequency of tests shall not be less than one (1) per two-feet (2’) vertical of backfill material to top of Final Backfill, not including Topsoil Backfill Material, starting at two feet (2') above top of Initial Backfill, in accordance with ASTM D 2922.
2. Failure
a. If compaction of the fill material does not meet or exceed the requirements that portion of fill material is to be further compacted and retested at the sole expense of the Contractor.

3.06 Storm Water Utilities Backfill

A. Main Piping and Accessories
1. Pipe Foundation
a. Shall be firm and undisturbed native material, or as required by the Drawings or Owner..
b. If disturbed it shall be compacted to same density as the native surrounding material.
2. Pipe Embedment Backfill
a. General
1) All pipe and fittings that are not laid in encasement pipe, shall be completely embedded as specified.
a) This embedment includes the bottom, sides and top of pipe and fittings including bells, so that all portions will be encased to insulate the pipe from the natural ground and from the backfill.
2) All trenches and excavation shall be backfilled as soon as is practical after the pipes and accessories are properly placed.
3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
4) Flooding or jetting of backfill is not allowed.
b. All Pipes
1) Material
a) Excavation less than twenty-feet (<20’) in depth and above groundwater table:
(1) Shall be Class I Backfill Material, Class II Backfill Material, Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
b) Excavation greater than twenty-feet (>20’) in depth and below groundwater table:
(1) Shall be Coarse Aggregate Backfill Material, or as required by the Drawings or Owner.
2) Pipe Bedding

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a) Six-inches (6”) below the bottom of pipe and the total width of the trench, or as required by the Drawings or Owner.
b) In order to reduce the amount of material required, the trench bottom may be excavated in a rounded manner so as to maintain at least a minimum of twelve-inches (12”) of embedment material between the excavation sides and the pipe.

3) Initial Backfill
a) Twelve-inches (12”) above the top of pipe and the total width of the trench, or as required by the Drawings or Owner.

c. Placement
1) Shall be placed in a manner as to not damage any utility or improvements.
2) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

d. Compaction
1) General
a) Shall be compacted in a manner as to not damage any utility or improvements.
2) Class I Backfill Material
a) Hand tamp with tamping plate or other approved method at a moisture content determined by the Contractor for effective compaction without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
3) Class II Backfill Material
a) Hand tamp with tamping plate or other approved method at three-percent (3%) of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 698 without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
4) Cement Stabilized Sand Backfill Material
a) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
5) Coarse Aggregate Backfill Material
a) Hand tamp with tamping plate or other approved method for effective compaction, or as required by the Drawings or Owner.

3. Final Backfill
a. General
1) All trenches and excavation shall be backfilled as soon as is practical after the embedment and accessories have been properly placed.
2) The placing of the material shall be done in such a manner so as to be free of all foreign matter.
3) Flooding or jetting of backfill is not allowed.

b. Material
1) Paved Areas
a) Top of Embedment Material to three-feet (3’) below the bottom of road subgrade material
(1) Select Backfill Material, or as required by the Drawings or Owner.
b) Three-feet (3’) below the bottom of road base material to the bottom of the

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road subgrade material
(1) Cement Stabilized Sand Backfill Material.
2) Non-Paved Areas
a) Top of Embedment Material to six-inches (6”) below finished grade
(1) Native Backfill Material, or as required by the Drawings or Owner.
b) Top six-inches (6”)
(1) Topsoil Backfill Material, or as required by the Drawings or Owner.
c. Placement
1) Shall be placed in a manner as to not damage any utility or improvements.
2) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
d. Compaction
1) General
a) Shall be compacted in a manner as to not damage any utility or improvements.
2) Select Backfill Material
a) Compacted by use of industry standard equipment at zero to five-percent (0-5%) of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 698, or as required by the Drawings or Owner.
3) Cement Stabilized Sand Backfill Material
a) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
4) Native Backfill Material
a) Compacted by use of industry standard equipment to ninety-percent (90%) Standard Proctor, or as required by the Drawings or Owner.
5) Topsoil Backfill Material
a) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench, or as required by the Drawings or Owner.
b) Compacted by use of industry standard equipment to a firm density, or as required by the Drawings or Owner.
4. Utility Crossings
a. Outside of the pipes are within two-feet (2’) of each other
1) Material
a) Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
2) Encasement Requirement
a) Below Pipe
(1) As required in previous parts of this section, or as required by the Drawings or Owner.
b) Sides of Pipe
(1) As required in previous parts of this section, or as required by the Drawings or Owner.
c) Above Pipe
(1) As required in previous parts of this section, or as required by the

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Drawings or Owner.
d) Distance beyond crossing
(1) Three-feet (3') or as required by the Drawings, owner of utility(ies), or Owner.
3) Placement
a) Shall be placed in a manner as to not damage any utility or improvements.
b) Shall be placed in layers not more than eight-inches (8") in depth (loose measurement) the total width of the trench.
c) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
4) Compaction
a) Shall be compacted in a manner as to not damage any utility or improvements.
b) Material shall be placed and be compacted under, around the side, and over the utility(ies) in a manner that will reduce damage and settlement to a minimum or as approved by the Owner.
c) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
b. Outside of the pipes are beyond two-feet (2') of each other
1) Shall be as required for Main Piping and Accessories, or as required by the Drawings, owner of utility(ies), or Owner.
5. Compaction Testing
a. Frequency of tests shall not be less than one (1) for any pipe section between manholes, junction boxes, inlets, and every one-hundred linear feet (100') of main pipe per two-feet (2') vertical of backfill material to top of Final Backfill, not including Topsoil Backfill Material, starting at two feet (2') above top of pipe, in accordance with ASTM D 2922.
b. Failure
1) If compaction of the fill material does not meet or exceed the requirements that portion of fill material is to be further compacted and retested at the sole expense of the Contractor.

B. Manhole
A. Schedule of Backfilling
1. Backfilling around the manholes shall commence as soon as concrete or masonry has been allowed to cure the required time and forms and shoring have been removed.
B. Subgrade
1. Shall be undisturbed native material, or as required by the Drawings or Owner.
2. Compact top six-inches (6") to 95% Standard Proctor Density.
C. Bedding
1. General
a. The placing of the backfill material shall be done in such a manner so as to be free of all natural soil or other foreign matter and prevent damage to any other work.
2. Material
a. Crushed Stone Backfill Material, or as required by the Drawings or Owner.
3. Requirement
a. Below Foundation

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(1) Eight-inches (8”) , or as required by the Drawings or Owner
b. Width
(1) Foundation width plus two-feet (2’) or to edge of excavation whichever is greater.
4. Placement
a. Shall be placed in a manner as to not damage any utility or improvements.
b. Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
c. The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
5. Compaction
a. General
(1) Shall be compacted in a manner as to not damage any utility or improvements.
b. Class I Backfill Material
(1) Hand tamp with tamping plate or other approved method at a moisture content determined by the Contractor for effective compaction without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
c. Class II Backfill Material
(1) Hand tamp with tamping plate or other approved method at three-percent (3%) of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 698 without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
d. Crushed Stone Backfill Material
(1) Hand tamp with tamping plate or other approved method for effective compaction, or as required by the Drawings or Owner.

D. Initial Backfill
1. General
a. The placing of the material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter and prevent damage to any other work.
2. Material
a. Excavation less than twenty-feet (<20’) in depth and above groundwater table:
(1) Shall be Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
b. Excavation greater than twenty-feet (>20’) in depth and below groundwater table:
(1) Shall be Flowable Fill Backfill Material, or as required by the Drawings or Owner.
(2) Allow to cure prior to placement of Final Backfill
3. Requirement
a. Above Bedding
(1) Five-feet (5’) or to the bottom of the bottom of road subgrade material, whichever is less, or as required by the Drawings or Owner
b. Width
(1) To extent of excavation.
4. Placement
a. Shall be placed in a manner as to not damage any utility or improvements.
b. Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.

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c. The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

5. Compaction
   a. General
      (1) Shall be compacted in a manner as to not damage any utility or improvements.
   b. Cement Stabilized Sand Backfill Material
      (1) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

E. Final Backfill
1. General
   a. All trenches and excavation shall be backfilled as soon as is practical after the embedment and accessories have been properly placed.
   b. The placing of the material shall be done in such a manner so as to be free of all foreign matter.
   c. Flooding or jetting of backfill is not allowed.
2. Material
   a. Paved Areas
      (1) Top of Initial Backfill to the bottom of road subgrade material
         (a) Cement Stabilized Backfill Material, or as required by the Drawings or Owner.
   b. Non-Paved Areas
      (1) Top of Initial Backfill to six-inches (6”) below finished grade
         (a) Native Backfill Material, or as required by the Drawings or Owner.
      (2) Top six-inches (6”)
         (a) Topsoil Backfill Material, or as required by the Drawings or Owner.
3. Placement
   1) Shall be placed in a manner as to not damage any utility or improvements.
   2) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
   3) The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
4. Compaction
   a. General
      (1) Shall be compacted in a manner as to not damage any utility or improvements.
   b. Cement Stabilized Sand Backfill Material
      (1) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
   c. Native Backfill Material
      (1) Compacted by use of industry standard equipment to ninety-percent (90%) Standard Proctor, or as required by the Drawings or Owner.
   d. Topsoil Backfill Material
      (1) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench, or as required by the Drawings

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or Owner.
(2) Compacted by use of industry standard equipment to a firm density, or as required by the Drawings or Owner.
5. Compaction Testing
a. Frequency of tests shall not be less than one (1) per two-feet (2') vertical of backfill material to top of Final Backfill, not including Topsoil Backfill Material, starting at two feet (2') above top of Initial Backfill, in accordance with ASTM D 2922.
b. Failure
(1) If compaction of the fill material does not meet or exceed the requirements that portion of fill material is to be further compacted and retested at the sole expense of the Contractor.

C. Inlet
A. Schedule of Backfilling
1. Backfilling shall commence as soon as concrete or masonry has been allowed to cure the required time and forms and shoring have been removed.
B. Subgrade
1. Shall be undisturbed native material, or as required by the Drawings or Owner.
2. Compact top six-inches (6") to 95% Standard Proctor Density.
C. Bedding
1. General
a. The placing of the backfill material shall be done in such a manner so as to be free of all natural soil or other foreign matter and prevent damage to any other work.
2. Material
a. Crushed Stone Backfill Material, or as required by the Drawings or Owner.
3. Requirement
a. Below Foundation
(1) Eight-inches (8"), or as required by the Drawings or Owner
b. Width
(1) Foundation width plus two-feet (2') or to edge of excavation whichever is greater.
4. Placement
a. Shall be placed in a manner as to not damage any utility or improvements.
b. Shall be placed in layers not more than eight-inches (8") in depth (loose measurement) the total width of the trench.
c. The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.
5. Compaction
a. General
(1) Shall be compacted in a manner as to not damage any utility or improvements.
b. Crushed Stone Backfill Material
(1) Hand tamp with tamping plate or other approved method for effective compaction, or as required by the Drawings or Owner.
D. Initial Backfill
1. General
a. The placing of the material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter and prevent damage to any other work.
2. Material

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a. Paved Side
(1) Shall be Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
(2) Requirement
(a) Above Bedding
i. Five-feet (5') or to the bottom of the bottom of road subgrade material, whichever is less, or as required by the Drawings or Owner
(b) Width
i. To extent of excavation.
b. Non Paved Side
(1) Shall be Cement Stabilized Sand Backfill Material, or as required by the Drawings or Owner.
(2) Requirement
(a) Above Bedding
i. Five-feet (5') or eight-inches (8") below final grade, or as required by the Drawings or Owner
(b) Width
i. To extent of excavation.

3. Placement
a. Shall be placed in a manner as to not damage any utility or improvements.
b. Shall be placed in layers not more than eight-inches (8") in depth (loose measurement) the total width of the trench.
c. The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

4. Compaction
a. Shall be compacted in a manner as to not damage any utility or improvements.
b. Cement Stabilized Sand Backfill Material
(1) Shall be hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.

E. Final Backfill
1. General
a. All trenches and excavation shall be backfilled as soon as is practical after the embedment and accessories have been properly placed.
b. The placing of the material shall be done in such a manner so as to be free of all foreign matter.
c. Flooding or jetting of backfill is not allowed.

2. Material
a. Paved Side
(1) Top of Initial Backfill to the bottom of road subgrade material
(a) Cement Stabilized Backfill Material, or as required by the Drawings or Owner.
b. Non-Paved Side
(1) Top of Initial Backfill Material to six-inches (6") below finished grade
(a) Native Backfill Material, or as required by the Drawings or Owner.
(2) Top six-inches (6")
(a) Topsoil Backfill Material, or as required by the Drawings or Owner.

3. Placement
a. Shall be placed in a manner as to not damage any utility or improvements.

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b. Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench.
c. The placing of the embedment material shall be done in such a manner so as to be free of all natural soil, rock, or other foreign matter.

4. Compaction
   a. General
      (1) Shall be compacted in a manner as to not damage any utility or improvements.
   b. Cement Stabilized Sand Backfill Material
      (1) Hand tamp with tamping plate or other approved method on the dry side of optimum moisture content to ninety-five percent (95%) of maximum dry density determined according to ASTM D 558 but sufficient for effective hydration of the cement without softening the soil of foundation or trench walls, or as required by the Drawings or Owner.
   c. Native Backfill Material
      (1) Compacted by use of industry standard equipment to ninety-percent (90%) Standard Proctor, or as required by the Drawings or Owner.
   d. Topsoil Backfill Material
      (1) Shall be placed in layers not more than eight-inches (8”) in depth (loose measurement) the total width of the trench, or as required by the Drawings or Owner.
      (2) Compacted by use of industry standard equipment to a firm density, or as required by the Drawings or Owner.

F. Compaction Testing
   1. Frequency of tests shall not be less than one (1) per two-feet (2’) vertical of backfill material to top of Final Backfill, not including Topsoil Backfill Material, starting at two feet (2') above top of Initial Backfill, in accordance with ASTM D 2922.
   2. Failure
      a. If compaction of the fill material does not meet or exceed the requirements that portion of fill material is to be further compacted and retested at the sole expense of the Contractor.

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SECTION 33 42 11
STORMWATER GRAVITY PIPING

PART 1 - GENERAL

1.01 Description
A. This specification shall govern work required for the furnishing and placing of stormwater pipe and the material and incidental construction requirements for stormwater pipe as required to complete the project.

1.02 Related Sections
A. 03 21 11 REINFORCING STEEL
B. 03 31 11 CONCRETE STRUCTURES
C. 31 23 16.13 TRENCHING
D. 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES
E. 33 05 07 TRENCHLESS UTILITY INSTALLATION

1.03 References *The latest edition of the referenced item below shall be used.*
A. AASHTO M 198 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
B. AASHTO M 259 – Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
C. AASHTO M 273 – Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 2 ft of Cover Subjected to Highway Loadings
D. AASHTO M 288 – Standard Specification for Geotextile Specification for Highway Applications
E. ASTM C 76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, Sewer Pipe
F. ASTM C 443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe using Rubber Gaskets.
G. ASTM C 497 – Standard Test Method for Concrete Pipe, Manhole Sections, or Tile.
H. ASTM C 506 – Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, Sewer Pipe.
I. ASTM C 507 – Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, Sewer Pipe.
J. ASTM C 655 – Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain, Sewer Pipe.
K. ASTM C 990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
L. ASTM C 1433 – Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers.
M. ASTM D 2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
N. Texas Department of Transportation (TxDOT) Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges Item 462 – Concrete Box Culverts and Storm Drains
O. *American Association of State Highway and Transportation Officials* (AASHTO)
P. American Welding Society Specifications
Q. American Concrete Pipe Association (ACPA)
R. National Precast Concrete Association (NCPA)

1.04 Submittals
A. Pipe information noting compliance with this specification.

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B. Gasket information noting compliance with this specification.

PART 2 - PRODUCTS

2.01 General

A. All pipe shall be manufactured at an American Concrete Pipe Association (ACPA) Certified Plant or a National Precast Concrete Association (NCPA) Certified Plant.
B. To substitute a material or equipment it will be the responsibility of the Contractor to provide all required information to determine that the material or equipment is equal or better to the Owner for approval prior to incorporation into the Project.
C. All products shall be in accordance with this specification unless otherwise noted on the Drawings.

2.02 Concrete Pipe

A. General
   1. All pipe shall be bell and spigot, unless otherwise noted on the Drawings or indicated by the Owner.
   2. Bell and spigot shall be formed for the acceptance of gasket material
B. Workmanship and Finish
   1. Pipe shall be substantially free from fractures, large or deep cracks and surface roughness.
   2. The ends of the pipe shall be normal to the walls and centerline of the pipe within the limits of variations allowed under the applicable ASTM specification.
   3. Shall be in accordance with the industry standards.
      a. In the event that one requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.
C. Fabrication
   1. Pipe shall conform to ASTM Designation C 76 for Circular Pipe; ASTM Designation C 506 for Arch Pipe, or ASTM Designation C 507 for Elliptical Pipe.
   2. All precast concrete pipe shall be machine made or cast by a process that will provide for uniform placement of the concrete in the form and compaction by mechanical devices that will assure a dense concrete.
   3. Concrete shall be mixed in a central batch plant or other approved batching facility from which the quality and uniformity of the concrete can be assured.
   4. Transit mixed concrete will not be acceptable for use in precast concrete pipe.
D. Lifting Holes
   1. Do not place more than two (2) holes for lifting and placing in the top section of precast pipe
   2. Cast, cut, or drill the lifting holes in the wall of the pipe.
      a. The holes shall be neat and without spalling of the concrete.
   3. The maximum hole diameter is three-inch (3”) at the inside surface of the pipe wall and four-inch (4”) at the outside surface.
   4. Do not cut more than one (1) longitudinal wire or two (2) circumferential wires per layer of reinforcing steel when locating lift holes.
E. Design
   1. All pipe shall be Class III (Wall "B") unless otherwise specified on the Drawings.
   2. The shell thickness, the amount of circumferential reinforcement and the strength of the pipe shall conform to the specified Class as summarized in ASTM Designation C 76 for Circular Pipe; C 506 for Arch Pipe; C 507 for Elliptical pipe.
   3. Minimum cover for all pipes shall be one foot (1’).
F. Physical Test Requirements

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1. The acceptability of the pipe shall be determined by the results of the following tests:
   a. Material tests required in ASTM C 76, C 655, C 506, or C 507
   b. Absorption tests in accordance with ASTM C 497
   c. Three-edge bearing test in accordance with ASTM C 497
      1) Shall be performed on one (1) pipe for each 300 pipes, or faction thereof, for each type, size class, or D-Load produced within 30 calendar days.
      2) Test for the load to produce a 0.01-inch crack or fifteen-percent (15%) in excess of the required D-Load, whichever is less.
      3) Test the pipe to ultimate load when directed.
   d. As an alternate to the three-edge bearing test, concrete pipe fifty-four inches (54”) in diameter and larger may be accepted, at the option of the manufacturer, on the basis of compressive strength of cores cut from the wall of the pipe.
   e. The manufacturer must determine the compressive strength of the samples. Obtain, cure, prepare, and test the cores in accordance with ASTM C 496.
   f. The manufacturer must plug and seal the core holes in the pipe wall after testing.
   g. Inspect the finished pipe to determine its conformance with the design prescribed in these specifications and its freedom from defects.

G. Marking
   1. The following information shall be clearly marked on each section of pipe:
      a. The class of pipe,
      b. ASTM designation,
      c. The date of manufacture,
      d. The name of trade mark of the manufacturer,
      e. All markings shall be indented on the pipe section or painted thereon with waterproof paint.
      f. Elliptical Pipe
         1) One (1) end of each section of pipe with elliptical reinforcement shall be clearly marked during the process of manufacture or immediately thereafter on the inside and the outside of opposite walls to show the location of the "top" or "bottom" of the pipe as it should be installed, unless the external shape of the pipe is such that the correct position of the top and bottom is obvious.

H. Inspection
   1. The quality of materials, the process of manufacture, and the finished pipe shall be subject to inspection and approval by the Engineer at the pipe manufacturing Plant.
   2. In addition, the finished pipe shall be subject to further inspection by the Owner at the project site prior to and during installation.

I. Curing
   1. Pipe shall be cured in accordance with the applicable ASTM Specification for each type of pipe.

J. Minimum Age for Shipment
   1. Pipe shall be considered ready for shipment when it conforms to the requirements of the tests specified herein and has cured.

K. Causes for Rejection
   1. Pipe shall be subject to rejection on account of failure to conform to any of the specification requirements.
   2. Individual sections of pipe may be rejected because of any of the following:
      a. Fractures or cracks passing through the shell, except for a single end crack that does not exceed the depth of the joint,
      b. Defects that indicate imperfect proportioning, mixing and molding,
      c. Surface defects indicating honeycombed or open texture,
      d. Damaged ends, where such damage would prevent making a satisfactory joint,

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e. Any continuous crack having a surface width of 0.01 inch or more and extending for a length of twelve-inch (12”) or more.
f. Circular pipe which is “out-of-round”.

L. Repairs
1. Pipe may be repaired if necessary, because of occasional imperfections in manufacture or accidental injury during the handling in accordance with manufacturer recommendations, and will be acceptable if, in the opinion of the Owner, the repairs are sound and properly finished and cured and the repaired pipe conforms to the requirements of the specifications.

M. Rejections
1. All rejected pipes shall be plainly marked by the Owner and shall be replaced by the Contractor with pipe that meets the requirements of these specifications.
2. Such rejected pipe shall be removed immediately from the worksite.

2.03 Concrete Box Culvert

A. General
1. The Contractor shall have the option of furnishing cast-in-place and/or precast boxes unless a specific type is called for on the Drawings or in the special provisions.

B. Cast-in Place
1. When cast-in-place boxes are used, they shall conform to the details of the culvert designs shown in the Drawings.

C. Precast
1. General
a. All pipe shall be manufactured at an American Concrete Pipe Association (ACPA) Certified Plant or a National Precast Concrete Association (NCPA) Certified Plant.
b. All box culvert shall be bell and spigot, unless otherwise noted on the Drawings or indicated by the Owner.
c. Bell and spigot shall be formed for the acceptance of gasket material
2. Workmanship and Finish
a. Box culvert shall be substantially free from fractures, large or deep cracks and surface roughness.
b. The ends of the box culvert shall be normal to the walls and centerline of the box culvert within the limits of variations allowed under the applicable ASTM specification.
c. Shall be in accordance with the industry standards.
1) In the event that one requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.
3. Fabrication
a. Box culvert shall conform to AASHTO M 259, AASHTO M 273, ASTM C 1433, and be rated for AASHTO HS-20 loading.
b. All precast concrete box culvert shall be machine made or cast by a process that will provide for uniform placement of the concrete in the form and compaction by mechanical devices that will assure a dense concrete.
c. Concrete shall be mixed in a central batch plant or other approved batching facility from which the quality and uniformity of the concrete can be assured.
d. Transit mixed concrete will not be acceptable for use in precast concrete box culvert.
4. Lifting Holes
a. Do not place more than four (4) holes for lifting and placing in the top section of precast box culvert
b. Cast, cut, or drill the lifting holes in the wall of the box culvert.
1) The holes shall be neat and without spalling of the concrete.
c. The maximum hole diameter is three-inch (3”) at the inside surface of the box culvert wall and four (4) inch at the outside surface.

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d. Do not cut more than one (1) longitudinal wire or two (2) circumferential wires per layer of reinforcing steel when locating lift holes.

5. Design
   a. All box culvert shall be Class III (Wall "B") unless otherwise specified on the Drawings.
   b. The shell thickness, the amount of circumferential reinforcement and the strength of the box culvert shall conform to ASTM C 1433.
   c. Minimum cover for all box culverts shall be two-foot (2').
6. Physical Test Requirements
   a. The acceptability of the box culvert shall be determined by the results of the following tests:
      1) Material tests required in ASTM C 1433.
      2) The manufacturer must plug and seal the core holes in the box culvert wall after testing.
      3) Inspect the finished box culvert to determine its conformance with the design prescribed in these specifications and its freedom from defects.
7. Marking
   a. The following information shall be clearly marked on each section of box culvert:
      1) The class of box culvert,
      2) ASTM designation,
      3) The date of manufacture,
      4) The name of trade mark of the manufacturer,
      5) All markings shall be indented on the box culvert section or painted thereon with waterproof paint.
8. Inspection
   a. The quality of materials, the process of manufacture, and the finished box culvert shall be subject to inspection and approval by the Engineer at the box culvert manufacturing Plant.
   b. In addition, the finished box culvert shall be subject to further inspection by the Owner at the project site prior to and during installation.
9. Curing
   a. Box culvert shall be cured in accordance with the applicable ASTM Specification for each type of box culvert.
10. Minimum Age for Shipment
    a. Box culvert shall be considered ready for shipment when it conforms to the requirements of the tests specified herein and has cured.
11. Causes for Rejection
    a. Box culvert shall be subject to rejection on account of failure to conform to any of the specification requirements.
    b. Individual sections of box culvert may be rejected because of any of the following:
       1) Fractures or cracks passing through the shell, except for a single end crack that does not exceed the depth of the joint,
       2) Defects that indicate imperfect proportioning, mixing and molding,
       3) Surface defects indicating honeycombed or open texture,
       4) Damaged ends, where such damage would prevent making a satisfactory joint,
       5) Any continuous crack having a surface width of 0.01 inch or more and extending for a length of twelve-inch (12") or more.
       6) Box culvert which is "out-of-square".
12. Repairs
    a. Box culvert may be repaired if necessary, because of occasional imperfections in manufacture or accidental injury during the handling in accordance with manufacturer recommendations, and will be acceptable if, in the opinion of the Owner, the repairs

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are sound and properly finished and cured and the repaired box culvert conforms to the requirements of the specifications.

13. Rejections
    a. All rejected box culverts shall be plainly marked by the Owner and shall be replaced by the Contractor with box culvert that meets the requirements of these specifications.
        1) Such rejected box culvert shall be removed immediately from the worksite.
14. Alternate designs of precast boxes will be considered for approval upon submission of shop drawings detailing the box and certifications that the box, as designed, is structurally comparable to or better than the box shown in the contract drawings and is designed to support HS-20 loading per AASHTO M 273 and ASTM C 1433.
    a. The shop drawings and certifications shall be signed and sealed by a Texas Registered Professional Engineer.

D. Concrete
1. Unless otherwise shown on the Drawings, Class "A" concrete shall be used for cast-in-place and precast (formed) boxes, conforming to the requirements of Section 03 31 11 CONCRETE STRUCTURES.
2. Class "C" concrete will be required for direct traffic boxes for cast-in-place and precast boxes.
3. Concrete for precast (machine-made) boxes shall meet the requirements of ASTM C 76, Sections: Cement, Aggregates and Mixture, and shall have a minimum twenty-eight (28) day compressive strength of 4,000 psi.

2.04 Corrugated Polyethylene Pipe

A. General
1. The product supplied under this specification shall be high density polyethylene corrugated exterior/smooth interior pipe. Twelve to 36 inch diameters shall conform to AASHTO M294 Type S; 8- and 10-inch diameters shall meet the strength requirements of AASHTO M252 with the addition that the pipe have a smooth interior liner. Material shall conform to ASTM D3350. Minimum conveyance factors shall be as shown in Table 1.

B. Rejection of Polyethylene Pipe
1. All rejected pipe shall be plainly marked by the Engineer and shall be replaced by the Contractor with pipe which meets the requirements of these specifications. Such rejected pipe shall be removed immediately from the site of work. Pipe shall be subject to rejection on account of failure to conform to any of the specification requirements. Individual sections of pipe may be rejected because of any of the following:
    a. Fractures or cracks passing through the shell, except for a single end crack that does not exceed the depth of the joint.
    b. Defects that indicate imperfect proportioning, mixing and molding.
    c. Damaged ends, where such damage would prevent making a satisfactory joint.
    d. Careless dumping of pipe from truck. The Engineer shall be judge of aforesaid items.

2.05 Jointing Materials

A. Concrete Pipe
1. Cold Applied Preformed Plastic Gaskets
    a. Shall conform to AASHTO M 198 and ASTM C 990.
    b. Joint material and primer shall be supplied for use on pipe as recommended by the manufacturer.
2. Geotextile for wrapping joints shall be Class 1 geotextile for subsurface drainage with an average opening size, AOS, of .22 mm. and two-feet (2) wide in accordance

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AASHTO M 288.

B. Polyethylene Pipe
   1. Pipe joints and fittings shall conform to AASHTO M252 or AASHTO M294
   2. All coupling bands shall conform to ASTM D3212 (10.8 psi watertight) and meet or exceed the soil-tightness requirements of the AASHTO Standard Specifications for Highway Bridges, Section 23, paragraph 23.3.1.5.4(e).
      a. Coupling bands shall cover at least one full corrugation on each section of pipe.
      b. When gasketed coupling bands are required, the gasket shall be made of closed-cell synthetic expanded rubber meeting the requirements of ASTM D1056, Grade RE42.
         1) All gaskets shall be installed on the coupler by the pipe manufacturer prior to delivery to the job site.
   3. Fittings shall conform to the requirements of AASHTO M294.

2.06 Lift Hole Plug

A. Concrete Plug
   1. Shall be tapered, or as recommended by the manufacturer of the pipe.
   2. Shall be used for mechanically and man-made lift holes
B. Polyethylene Plug
   1. Shall resist internal pressure within the pipe of a minimum of 7 psi.
   2. Shall be used for mechanically made lift holes

2.07 Cement Mortar

A. Shall be composed of one (1) part Portland Cement and (2) parts sand.

2.08 Backfill Materials

A. Shall be in accordance with Section 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES unless otherwise indicated on the Drawings.

PART 3 - EXECUTION

3.01 General

A. All Work shall be in accordance with the Contract, Specifications, Drawings, manufacturer recommendations, and industry standards.
   1. In the event that one requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.
B. Cast-in Place
   1. The requirement of Section 03 31 11.13 CONCRETE STRUCTURES shall govern for cast-in-place concrete culverts and for precast (formed) boxes except where otherwise specified herein.
   2. Concrete boxes shall be given an ordinary surface finish.
   3. Forms
      a. Forms for precast (machine-made) boxes shall be made of steel.
      b. Forms for cast-in-place boxes and precast (formed) boxes may be either wood or steel.
      c. Forms shall be mortar-tight and of sufficient strength to prevent excessive bulging or misalignment of adjacent boxes.
      d. They shall be constructed to permit their removal without damage to the concrete.
      e. Offsets at form joints shall not exceed one-eighth inch (1/8”).
      f. Forms shall be clean and free of extraneous matter when concrete is placed.
   4. Positive means of supporting steel cages in place throughout forming and concrete placement shall be required and subject to the approval of the Owner.
   5. Welding of reinforcing steel will be permitted only where shown on the Drawings.
      a. Welding shall be done by a qualified welder and shall conform to the requirements

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of the applicable section of the American Welding Society specifications.

C. Precast (machine-made) boxes shall be cast by a process, which will provide for uniform placement of the concrete in the forms and compaction by mechanical devices that will assure dense concrete.
D. Concrete shall be mixed in a central batch Plant or other approved batching facility from which the quality and uniformity of the concrete can be assured.
E. Transit mixed concrete shall not be acceptable for use in precast (machine-made) boxes.

3.02 Testing and Certification

A. Physical Requirements
   1. Precast boxes shall meet the requirement of TxDOT Tex 704-I.
B. Testing
   1. Testing shall be done by a Materials Engineering Laboratory which meets the requirements for membership in the American Council of Independent Laboratories.
C. Certification
   1. Certification of quality shall be provided with each delivery of materials to the job site by the manufacturer.
   2. Certification shall be a written report by the Materials Engineering Testing Laboratory.

3.03 Fabrication Tolerances

A. Precast boxes shall conform to the following tolerances:
   1. When two (2) box sections are fitted together on a flat surface, in proper alignment and in the position they will be installed, the longitudinal opening at any point shall not exceed one-inch (1”).
   2. When fine cracks or hairline cracks on the surface indicate poor curing practices, further production of precast boxes shall be discontinued until corrections are made and proper curing provided.

3.04 Defects and Repairs

A. Fine cracks or checks on the surface
   1. If it does not extend to the plane of the nearest reinforcement will not be cause for rejection unless they are numerous and extensive.
   2. Cracks that extend into the plane of the reinforcing steel but are acceptable otherwise, shall be repaired in an approved manner.
B. Small damaged or honeycombed areas
   1. Purely surface in nature may be repaired.
   2. Excessive damage, honeycomb or cracking will be subject to structural review.
   3. Repairs shall be sound, properly finished and cured in conformance with the pertinent specifications.

3.05 Excavation

A. As per Section 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES.

3.06 Laying Pipe

A. Unless otherwise authorized by the Owner, the laying of pipe on the prepared foundation shall be started at the outlet end with the spigot or tongue end pointing downstream and shall proceed upstream with the abutting sections properly matched, true to the established lines and grades.
B. Lifting holes shall be at the 12:00 position (on the top) of the pipe when pipe is in final place.
C. Where bell and spigot pipe are used, cross trenches shall be cut in the foundation to allow the barrel of the pipe to rest firmly upon the prepared bed.
   1. These cross trenches shall be not more than two-inches (2”) larger than the bell ends of the pipe.
D. Proper facilities shall be provided for hoisting and lowering the sections of pipe into the trench without disturbing the prepared foundation and the sides of the trench.
E. The ends of the pipe shall be carefully cleaned before the pipe is placed.

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F. As each length of pipe is laid, the mouth of the pipe shall be protected to prevent the entrance of earth or bedding material.
G. The pipe shall be fitted and matched so that when laid in the bed, it shall form a smooth, uniform conduit.
H. When elliptical pipe with circular reinforcing or circular pipe with elliptical reinforcing is used, the pipe shall be laid in the trench in such position that the markings "Top" or "Bottom", shall not be more than five (5) degrees from the vertical plane through the longitudinal axis of the pipe.
I. Multiple installations of reinforced concrete pipe shall be laid with the centerlines of individual barrels parallel. When not otherwise indicated on Drawings, the Table 1 clear distances between outer surfaces of adjacent pipe shall be used.

Table 1
Minimum Clear Distance Between Multiple Pipes

Diameter of Pipe (inch)	Clear Distance Between Pipes
18"	0'- 9"
24"	0'-11"
30"	1'- 1"
36"	1'- 3"
42"	1'- 5"
48"	1'- 7"
54"	1'-11"
60" to 84"	2'- 0"

3.07 Jointing

A. Joints using Cold Applied Preformed Plastic Gaskets:
   1. Primer
      a. Shall be installed as per manufacturer recommendations.
      b. No primer shall be applied over mud, sand, dirt, or sharp cement protrusions.
      c. The surface to be primed must be clean and dry when primer is applied.
   2. Gasket
      a. Before laying the pipe in the trench, the plastic gasket sealer shall be attached around the tapered tongue or tapered groove near the shoulder or hub of each pipe joint.
      b. Gasket shall be installed as per manufacturer recommendations.
      c. The paper wrapper shall be removed from one side only of the two-piece wrapper on the gasket and pressed firmly to the clean, dry pipe joint surface.
      d. When the atmospheric temperature is below 60 degrees F, plastic joint seal gaskets shall either be stored in an area warmed to above 70 degrees F, or artificially warmed to this temperature in a manner satisfactory to the Owner.
         1) Gaskets shall be applied to pipe joints immediately prior to placing pipe in trench, followed by connection to previously laid pipe.
      e. The outside wrapper shall not be removed until immediately before pushing the pipe into its final position.
      f. Additional gasket material may be required if, in the opinion of the Owner, a proper joint is not secured, and additional gasket material shall be required for non-circular concrete pipe as required by the Owner.
   3. Joining
      a. When the tongue is correctly aligned with the flare of the groove, the outside wrapper on the gasket shall be removed and the pipe shall be pulled or pushed home with

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sufficient force and power to cause the evidence of squeeze-out of the gasket material on the inside or outside around the complete pipe joint circumference.
b. Any joint material pushed out into the interior of the pipe that would tend to obstruct the flow shall be removed.
c. Pipe shall be pulled or pushed home in a straight line with all parts of the pipe on line and grade at all times.

4. All pipe joints shall be wrapped with Geotextile.
a. The wrap shall be centered on each joint.
b. The wrap does not remove the requirements of the use of gasket.

B. Mortar Joints
1. Is prohibited from jointing pipe except at manholes, pipe junction, etc., or where specifically approved by the Owner.
2. Pipe shall be pulled or pushed home in a straight line with all parts of the pipe on line and grade at all times.
3. Shall be placed as to form a durable watertight joint.
4. The installation shall be as required by the Owner.

3.08 Lifting Holes

A. When used by the Contractor to handle the pipe shall be used in accordance with manufacturer recommendations.
B. Filling of Hole
1. Concrete Plug
a. Plug shall be used in conjunction with a Cold Applied Preformed Plastic Gasket to form a seal that will not allow soil to migrate through the opening, or required on the Drawings or by the Owner.
b. Shall be used for mechanically and man-made lift holes
c. The pipe at the location of the plug shall be wrapped with Geotextile.
1) Care shall be taken to not allow the Geotextile to move or allow backfill material to be under Geotextile
2. Polyethylene Plug
a. Plug shall be installed as recommended by Manufacturer
b. Shall be covered with mortar and allowed to set to firm prior to installation of backfill
c. Shall be used only for mechanically made lift holes.

3.09 Backfill

A. Shall be in accordance with Section 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES unless otherwise indicated on the Drawings.

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SECTION 33 42 30
STORMWATER STRUCTURES

PART 1 - GENERAL

1.01 Description
A. This specification shall govern work required for the furnishing and installing of storm water utility manholes, inlets, frames, grates, and covers as required to complete the project.

1.02 Related Sections
A. 03 21 11 REINFORCING STEEL
B. 03 31 11 CONCRETE STRUCTURES
C. 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES
D. 33 42 11 STORMWATER GRAVITY PIPING

1.03 References The latest edition of the referenced item below shall be used.
A. AASHTO M 105 – Standard Specification for Gray Iron Castings
B. AASHTO M 288 – Standard Specification for Geotextile Specification for Highway Applications
C. AASHTO M 306 – Standard Specification for Drainage, Sewer, Utility, and Related Castings
D. ASTM A 27 – Standard Specification for Steel Castings, Carbon, for General Application
E. ASTM A 36 – Standard Specification for Carbon Structural Steel
F. ASTM A 48 – Standard Specification for Gray Iron Castings
G. ASTM A 536 – Standard Specification for Ductile Iron Castings
H. ASTM C 76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
I. ASTM C 443 – Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
J. ASTM C 478 – Standard Specification for Precast Reinforced Concrete Manhole Sections
K. ASTM C 581 – Practice for determining chemical resistance of thermosetting resins used in glass-fiber reinforced Structures Intended for Liquid Service
L. ASTM C 923 – Standard Specification for Resilient manhole connectors
M. ASTM D 695 – Test method for compressive properties of rigid plastics
N. ASTM D 790 – Test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials.
O. ASTM D 2412 – Test Method for external loading properties of plastic pipe by parallel-plate loading.
P. ASTM D 2583 – Test method for indentation hardness of rigid plastics by means of a barcol impresser.
Q. ASTM D 2584 – Test method for ignition loss of cured reinforced resins
R. ASTM D 3753 – Glass Fiber Reinforced Polyester Manholes
S. American Association of State Highway and Transportation Officials (AASHTO)
T. Texas Administrative Code Title 30, Part 1, Chapter 217, Subchapter C, Rule §217.55
U. Texas Accessibility Standards (TAS)
V. Texas Department of Transportation (TxDOT) Departmental Material Specification DMS 7340 – Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Junction Boxes and Inlets
W. American Welding Society

1.04 Submittals
A. Submit manufacturer’s data, details, and shop drawings for the following items showing compliance with specifications:
   1. Manhole
      a. Design
      b. Fabrication

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c. Fiberglass components
d. Installation instruction
e. Pipe Connector
f. Base
g. Inflow Inhibitor
2. Grade Adjustment Rings
3. Frames and Covers

PART 2 - PRODUCTS

2.01 General

A. To substitute a material or equipment it will be the responsibility of the Contractor to provide all required information to determine that the material or equipment is equal or better to the Owner for approval prior to incorporation into the Project.
B. All products shall be in accordance with this specification unless otherwise noted on the Drawings.

2.02 Manholes

A. General
1. Manholes may be made from cast in place Class "A" Concrete, precast concrete, fiberglass, or a combination of these materials when indicated by the Owner.
2. Reinforcing steel, if required, shall be as shown on Drawings.
a. Reinforcing Steel shall conform to the requirements of the specification Section 03 21 11 REINFORCING STEEL.
3. The bottom of manholes shall be carefully formed and inverted smoothly when finished, with pipes cut to fit inside surface of walls.
4. Mortar for masonry or plastering shall be:
a. One (1) part Portland Cement to three (3) parts clean hard and sharp mortar sand, free of all foreign substances or injurious alkalis.
b. Water shall be clean potable water free of foreign substances or injurious alkalis.
B. Concrete
1. Formed in Place
a. Shall be in accordance with Section 03 31 11 CONCRETE STRUCTURES
b. Concrete shall be Class "A" conforming to Section 03 31 11 CONCRETE STRUCTURES.
2. Precast
a. Precast manholes shall allow unobstructed view of all pipes connected to the manhole.
b. Precast manholes shall be designed in accordance with ASTM C 478, and AASHTO M 306.
1) Must be designed and sealed by a Texas Licensed Engineer.
c. Either concentric or eccentric cones may be required.
1) Where not specified, the eccentric cones shall be used.
d. Manhole designs shall be submitted for approval.
e. Shall be monolithic when possible.
1) If non-monolithic then joint shall be tongue and groove.
f. The following information shall be clearly marked on each manhole:
1) The class of pipe,
2) ASTM designation,
3) The date of manufacture,
4) The name of trade mark of the manufacturer,
5) Marking shall be indented on the pipe section or painted thereon with

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waterproof paint.

g. Shall be constructed with base of not less than twelve-inches (12”) thick below lowest invert.

C. Fiberglass
1. Fiberglass manholes shall be fabricated in accordance with ASTM D 3753 and the referenced design criteria as follows:
a. ASTM C 581 – Practice for determining chemical resistance of thermosetting resins used in glass-fiber reinforced Structures Intended for Liquid Service
b. ASTM D 695 – Test method for compressive properties of rigid plastics
c. ASTM D 790 – Test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials.
d. ASTM D 2412 – Test Method for external loading properties of plastic pipe by parallel-plate loading.
e. ASTM D 2583 – Test method for indentation hardness of rigid plastics by means of a barcol impresser.
f. ASTM D 2584 – Test method for ignition loss of cured reinforced resins
2. The minimum wall thickness for all fiberglass manholes at all depths shall be one-half inch (1/2”).
3. The inside diameter of the manhole barrel shall be either forty-eight inches (48") or one and one-half (1.5) times the nominal pipe diameter of the largest pipe, which ever is larger.
4. A concentric reducer over the barrel shall have a minimum inside diameter in accordance with the Drawings.
5. Shall be able to withstand AASHTO M 306 HS-20 Traffic Loading.
6. Markings and Identifications
a. Shall be placed on the inside and/or outside as required.
b. Inside required Markings and Identifications shall be placed immediately below the upper factory bond joint or approximately one foot (1’) below the corbel, whichever is less.
1) Manufacturers Name
2) Manufacturers Trademark
3) Manufacturers Serial Number
4) Manhole Length
5) ASTM Designation

D. Manhole Diameter
1. Shall be as noted on the Drawings
a. In all cases shall be in accordance with Texas Administrative Code Title 30, Part 1, Chapter 217, Subchapter C, Rule §217.55

E. Manhole Pipe Connectors
1. Fiberglass
a. Gasket Material
1) Shall be in accordance with ASTM C 923
2. Concrete
a. Shall provide a watertight connection and be in accordance with ASTM C 923
b. Mortar shall be used when indicated on the Drawings or by the Owner.

F. Geotextile Wrap
1. Shall be Class A Subsurface Drainage Geotextile, AASHTO M 288.

G. Manhole Base
1. Concrete shall be Class A in accordance with Section 03 31 11 CONCRETE STRUCTURES.
2. Precast Reinforced Concrete Manhole Base shall be in accordance with requirements

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of ASTM C 478 as shown on construction Drawings and detail Drawings.

3. Reinforcing Steel
   a. Reinforcing Steel shall conform to the requirements of the specification Section 03 21 11 REINFORCING STEEL.

2.03 Grade Adjustment Rings

A. All rings to adjust the height of the manhole shall be made from HDPE and withstand ASSHTO M 306 HS-20 Traffic Loading.
B. The internal diameter of the ring shall not be less than thirty inches (30”).

2.04 Inlets

A. General
   1. Concrete
      a. Concrete for inlets shall be Class "A" concrete conforming to the requirements of the specification, Section 03 31 11 CONCRETE STRUCTURES, except as otherwise provided on the Drawings.
      b. Mortar
         1) Mortar shall be composed of one (1) part Portland cement and two (2) parts clean, sharp mortar sand suitable graded for the purpose by conforming in other respects to the provisions of the section 03 31 11 CONCRETE STRUCTURES for fine aggregate.
         2) Hydrated lime or lime putty may be added to the mix but in no case shall it exceed ten-percent (10%) by weight of the total dry mix.
      c. Reinforcing Steel
         1) Reinforcing Steel shall conform to the requirements of the specification Section 03 21 11 REINFORCING STEEL.
B. Precast Inlet
   1. Submit shop drawings which indicate size of the inlet and is sealed by a Licensed Texas Professional Engineer.
   2. Inlet top shall be interlocking to the base and be grouted in which will construct a one-piece unit.
C. Inlet Pipe Connectors
   1. Gasket Material
      a. Shall be in accordance with Section 33 42 11 STORMWATER GRAVITY PIPING
         1) Rubber gaskets are not allowed.
   2. Geotextile Wrap
      a. Shall be Class A Subsurface Drainage Geotextile, AASHTO M 288.

2.05 Grade Adjustment Rings

A. All rings to adjust the height of the manhole shall be made from 100% HDPE and withstand ASSHTO M 306 HS-20 Traffic Loading.
B. The internal diameter of the ring shall not be less than thirty inches (30”).

2.06 Frames, Grates and Covers

A. General
   1. Manhole frame & cover shall be designated for street application designed to meet AASHTO M306 HS-20 Traffic Loading.
      a. Shall be rated for traffic service withstanding an application of 40,000 pound proof load in accordance with AASHTO M 306.
      b. Within the Right-of-Way and in Pavements, Sidewalks, Driveways
         1) Shall be heavy duty traffic rated meeting AASHTO M 306
      c. Within the Right-of-Way and in Pavements, Sidewalks, Driveways within School Zones
         1) Shall be heavy duty traffic rated and able to be bolted meeting AASHTO M 306
   2. All products shall be domestically made in the United States of America.

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3. Shall be in accordance with the details shown in the Drawings.
    a. Other patterns for frames, grates, and covers may be submitted for approval by the Owner
4. Cover shall be permeable with openings that meet the requirements of Texas Accessibility Standards (TAS)
5. Shall be true to pattern, form, and dimensions.
6. Shall be free from cracks, sponginess, and blowholes.
7. Shall be machined to yield a fit which will not rattle with passing traffic load.
8. Each casting shall be identifiable and show, at a minimum, the following:
    a. Name of the producing foundry
    b. Country of manufacture
    c. ASTM material designation
    d. Recycle symbol
    e. Individual part number
    f. Cast or heat date

B. Coatings
1. Shall be dipped in coal tar or asphalt unless the Drawings or Owner requires a different treatment.

C. Welded Steel Frames and Grates
1. Shall conform to the member size, dimensions and details shown on the Drawings and shall be welded into an assembly in accordance with those details.
2. Welding shall be in accordance with American Welding Society
3. Steel shall conform to the requirements of ASTM A 36.

D. Castings
1. Whether Carbon-Steel, Gray Cast Iron or Ductile Iron shall conform to the shape and dimensions shown in the Drawings and shall be clean substantial castings, free from burnt-on sand and shall be reasonable smooth.
    a. Runners, risers, fins, and other cast-on pieces shall be removed from the castings and such areas ground smooth.
2. Bearing surfaces between manhole rings and covers or grades and frames shall be cast or machined with such precision that uniform bearing shall be provided throughout the facilitate subsequent identification at installation.
3. Steel Castings
    a. Shall conform to the requirements of specifications for "Mild to Medium Strength Carbon Steel Castings for General Application", ASTM A 27.
    b. Grade 70-36 shall be furnished unless otherwise specified.
4. Cast Iron Castings
    a. Shall conform to the requirements of "Gray Iron Castings", ASTM A 48, Class 30, and AASHTO M 105.
5. Ductile Iron Castings
    a. Shall conform to the requirements of "Ductile Iron Castings", ASTM A 536.
    b. Grade 70-50-05 shall be used otherwise specified.

E. Openings
1. Shall be in accordance with Texas Administrative Code Title 30, Part 1, Chapter 217, Subchapter C, Rule §217.55

F. Manufacturing Facilities
1. Manufacturing facilities shall be domestic in compliance with Local, State, and Federal workplace and environmental regulations.

G. Bolts when required
1. Commercial grade 316 stainless steel bolts and nuts shall be used when indicated on the Drawings or required by the Owner.

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2.07 Concrete

A. All concrete and accessories shall be in accordance with Section 03 31 11 CONCRETE STRUCTURES and in accordance with this specification.
B. All concrete and accessories shall be rated for use in high sulfur dioxide conditions.

2.08 Non-Shrink Grout

A. Shall be prepackaged and meet the requirements of ASTM C1107, be flowable, Nonmetallic, Inorganic, Non-gas liberating, Cement based, have a compressive strength of 7000 psi, and requires only the addition of water.

2.09 Concrete Coatings

A. Provide as indicated on the Drawings or approved equal.

2.10 Backfill Materials

A. Shall be in accordance with Section 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES unless otherwise indicated on the Drawings.

PART 3 - EXECUTION

3.01 General

A. All Work shall be in accordance with the Contract, Specifications, Drawings, manufacturer recommendations, and industry standards.
    1. In the event that one requirement conflicts with another the more stringent requirement shall be followed, unless directed otherwise by the Owner.

3.02 Manholes

A. General
    1. All concrete work shall be performed in accordance with the requirements of the Section 03 31 11 CONCRETE STRUCTURES, unless otherwise specified.
    2. Refer to the Details within the Drawings for additional information regarding execution.
    3. Installation Assist Marks
        a. Shall be vertical lines 90 degrees apart at the base of the manhole and at other locations to assist in construction.
        b. Can be applied by Manufacturer and/or by Contractor.
        c. Marks shall be in a color and visible so that the Contractor and Owner can easily determine the use and determine when requirements are met.
        d. Required Marks
            1) Continuous mark around manhole
                a) Minimum embedment into base
                b) Maximum embedment into base
                c) Minimum initial backfill height
            2) Location of dowels (if required)
            3) Location and size of pipe penetrations prior to cut.
B. Excavation
    1. As per Section 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES.
C. Non-monolithic
    1. The tongue and groove joint shall have a gasket material placed between prior to joining and exterior of joint wrapped with geotextile.
D. Wall Preparation for Pipe Penetrations
    1. Cut shall be equal to the outside diameter of pipe to pass through it, plus two-inches (2”), plus gasket to form a non-leak seal.
    2. Cuts are to be made using electric or gasoline powered circular saw with proper blade.
    3. Impact type tools shall not be used.
    4. Where multiple pipe connections occur, maximum wall cutout shall not exceed manufacturer’s recommendations, nor shall be cut leaving less than twelve-inches (12”) between pipes, unless otherwise noted on the Drawings or approved by Owner.

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E. Pipe Penetrations
   1. Pipe connection shall be made with gasket material installed in accordance with the manufacturer's recommendations and the exterior portion shall have geotextile placed across it, unless otherwise noted on the Drawings or approved by the Owner.
F. Pipe Stub outs for Future Connections
   1. Shall be installed where noted on the Drawings and in accordance with the details.
   2. Shall have an approved gasket placed between pipe and manhole.
   3. Gasket shall be installed in accordance with the manufacturer's recommendations.
   4. A watertight plug shall be installed in the pipe at the end of the pipe and remain until the pipe is connected for future service.
G. Handling
   1. Shall be handled and stored in a safe manner as necessary to prevent damaging either the item or the surroundings.
   2. Manholes shall be lifted as specified by the manufacturer.
      a. If manhole must be moved by rolling, the ground which it transverses shall be smooth and free of rocks, debris, etc.
H. Installation
   1. Shall be installed as specified by the manufacturer and in accordance with this specification and the details.
   2. Field verify all existing elevations and conditions prior to ordering new manholes.
I. Inverts
   1. The inverts passing out or through the manhole shall be shaped and routed across the floor of manhole as shown on the Drawings.
   2. This shaping may be accomplished by adding and shaping mortar or concrete after the base is cast or by placing the required additional material with the base.
J. Concrete and Grout
   1. Concrete
      a. All concrete work shall be completed in accordance with Section 03 31 11 CONCRETE STRUCTURES.
      b. All concrete shall be placed within forms.
   2. Grout
      a. Grout shall be placed in a manner which will not allow for separation of materials.
      b. All exposed grout inside the manhole shall have an approved concrete coating applied to the surface in accordance with the manufacturers' recommendations.
K. Backfill
   1. Shall be in accordance with Section 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES unless otherwise indicated on the Drawings.
L. Grade Adjustment Rings
   1. A minimum of twelve-inches (12") of rings are allowed.
   2. A maximum of eighteen-inches (18") of rings are allowed.
M. Concrete Collar
   1. Shall be circular or square of size indicated on the Drawings.
   2. Concrete shall be in accordance with Section 03 31 11 CONCRETE STRUCTURES.
   3. Traffic shall be restricted from the traversing across for thirty-six (36) hours after placement of frame and concrete.

3.03 Inlets

A. General
   1. Shall be constructed from concrete with all concrete work in accordance with the requirements of the Section 03 31 11 CONCRETE STRUCTURES, unless otherwise specified.
   2. Forms will be required for all concrete walls, except where the nature of the surrounding

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material is such that it can be trimmed to a smooth vertical face.

3. Inlets for Precast Concrete Pipe Sewers.
    a. The construction of inlets for precast concrete pipe sewers shall be done as soon as is practicable after storm lines into or through inlet locations are completed.
    b. All sewers shall be cut neatly at the inside face of the walls of inlet and cleaned up with mortar.

B. Excavation
1. As per Section 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES.

C. Wall Preparation for Pipe Penetrations
1. Cut shall be equal to the outside diameter of pipe to pass through it, plus two-inches (2”), plus gasket to form a non-leak seal.
2. Cuts are to be made using electric or gasoline powered circular saw with proper blade.
3. Impact type tools shall not be used.
4. Where multiple pipe connections occur, maximum wall cutout shall not exceed manufacturer’s recommendations, nor shall be cut leaving less than twelve-inches (12”) between pipes, unless otherwise noted on the Drawings or approved by Owner.

D. Pipe Penetrations
1. Pipe connection shall be made with gasket material installed in accordance with the manufacturer’s recommendations and the exterior portion shall have geotextile placed across it, unless otherwise noted on the Drawings or approved by the Owner.

E. Pipe Stub outs for Future Connections
1. Shall be installed where noted on the Drawings and in accordance with the details.
2. Shall have an approved gasket placed between pipe and manhole.
3. Gasket shall be installed in accordance with the manufacturer’s recommendations.
4. A watertight plug shall be installed in the pipe at the end of the pipe and remain until the pipe is connected for future service.

F. Handling
1. Shall be handled and stored in a safe manner as necessary to prevent damaging either the item or the surroundings.
2. Manholes shall be lifted as specified by the manufacturer.
    a. If manhole must be moved by rolling, the ground which it transverses shall be smooth and free of rocks, debris, etc.

G. Installation
1. Shall be installed as specified by the manufacturer and in accordance with this specification and the details.
2. Field verify all existing elevations and conditions prior to ordering new manholes.

H. Inverts
1. The inverts passing out or through the inlet shall be shaped and routed across the floor of inlet as shown on the Drawings.
2. This shaping may be accomplished by adding and shaping mortar or concrete after the base is cast or by placing the required additional material with the base.

I. Concrete and Grout
1. Concrete
    a. All concrete work shall be completed in accordance with Section 03 31 11 CONCRETE STRUCTURES.
    b. All concrete shall be placed within forms.
2. Grout
    a. Grout shall be placed in a manner which will not allow for separation of materials.
    b. All exposed grout inside the manhole shall have an approved concrete coating applied to the surface in accordance with the manufacturers’ recommendations.

J. Backfill

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1. Shall be in accordance with Section 33 05 10 EXCAVATION AND BACKFILL FOR UTILITIES unless otherwise indicated on the Drawings.

3.04 Frames, Grates and Covers

A. Frames, grates, and covers shall be constructed of the materials as specified and in accordance with the details shown on the Drawings and shall be placed carefully to the lines or grades indicated on the Drawings or as directed by the Owner.
B. All welding shall conform to the requirements of the applicable section of the latest American Welding Society Specifications.
C. Apply non-seize graphite or approved equal around all the frame, grate, and/or cover prior to installation.

3.05 Grade Adjustment of Existing Fiberglass Manhole

A. Adjustment by Rings
   1. The adjustment of the frame and cover is to be achieved by removal or addition of HDPE grade adjustment rings that rest above the fiberglass corbel.
   2. Butyl Sealant shall be placed between each ring in a manner to form a continuous seal between each ring.
   3. Butyl Sealant shall be placed between the ring and manhole to form a continuous seal.
B. Adjustment by Lowering Top of Manhole
   1. If the frame and cover must be lowered to the extent that the new elevation cannot be achieved by removal of grade adjustment rings and it is necessary to remove a section of the fiberglass manhole, this work shall be done as described below:
      a. All work shall be in accordance with manufacturer recommendations.
      b. Remove the appropriately sized section of the existing manhole from the vertical manhole wall at least six inches (6") below the seam where the corbel meets the vertical wall.
      c. Excavate evenly around the manhole as required.
      d. Mark, cut and remove the required section of the manhole.
         1) Make a square cut as necessary for a good butt splice.
      e. Grind and clean ends of fiberglass that are to be re-united.
      f. Replace and align the top.
      g. Apply new Fiberglass in accordance with Manhole Manufacturer recommendations and the recommendations of the repair kit.
         1) Repair kit shall be of type as required by Manhole Manufacturer.
      h. After curing, backfill in accordance with the backfill requirements for Manholes, the Drawings, and/or as directed by the Owner.
C. Concrete Collar
   1. Shall be circular or square of size indicated on the Drawings.
   2. Concrete shall be in accordance with Section 03 31 11 CONCRETE STRUCTURES.
   3. Traffic shall be restricted from the traversing across for thirty-six (36) hours after placement of frame and concrete.

3.06 Grade Adjustment of Existing Concrete Manhole

A. Shall be in accordance with the Drawings.

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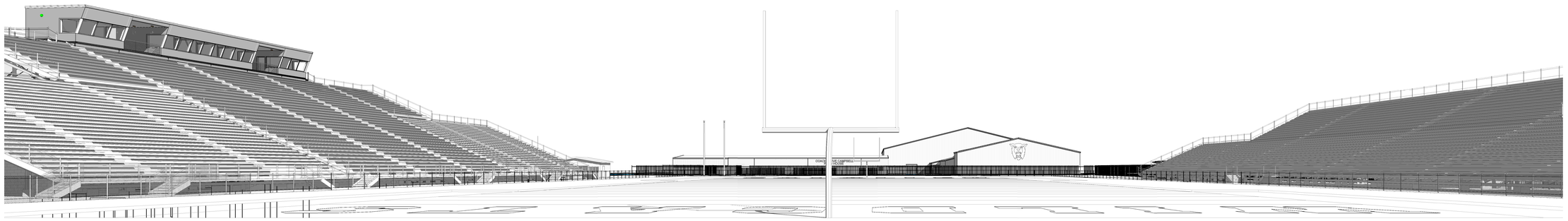
HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT



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ABBREVIATIONS

ABV	ABOVE	HOR	HORIZONTAL
ADD	ADDENDUM	ID	INSIDE DIAMETER
ADDL	ADDITIONAL	INFO	INFORMATION
ADJ	ADJACENT	INT	INTERIOR
AFF	ABOVE FINISH FLOOR	INV	INVERT
ALUM	ALUMINUM	LAV	LAVATORY
APPROX	APPROXIMATELY	LH	LEFT HAND
ARCH	ARCHITECT(URAL)	MFR	MANUFACTURER
ACT	ACOUSTICAL CEILING TILE	MAX	MAXIMUM
AUTO	AUTOMATIC	MECH	MECHANICAL
BD	BOARD	MEP	MECHANICAL, ELECTRICAL, & PLUMBING
BK	BRICK	MIN	MINIMUM
BLDG	BUILDING	MISC	MISCELLANEOUS
BLKG	BLOCKING	MTL	METAL
BM	BEAM	NIC	NOT IN CONTRACT
BOTT	BOTTOM	NO	NUMBER
BOD	BOTTOM OF DECK	NOM	NOMINAL
CFMF	COLD FORMED METAL FRAMING	NTS	NOT TO SCALE
CLR	CLEAR	OC	ON CENTER
CMU	CONCRETE MASONRY UNIT	OFCI	OWNER FURNISH CONTRACTOR INSTALL
CO	CLEANOUT	OFOI	OWNER FURNISH OWNER INSTALL
COL	COLUMN	OH	OVERHEAD
CONC	CONCRETE	OPH	OPPOSITE HAND
CONT	CONTINUOUS	OSB	ORIENTED STRAND BOARD
CJ	CONTROL JOINT	PL	PLATE
CL	CENTERL LINE	PLAM	PLASTIC LAMINATE
DEMO	DEMOLITION	PLYWD	PLYWOOD
DIA	DIAMETER	PSF	POUNDS PER SQUARE FOOT
DIM	DIMENSION	PSI	POUNDS PER SQUARE INCH
DOCS	DOCUMENTS	PVC	POLYVINYL CHLORIDE
DS	DOWNSPOUT	RD	ROOF DRAIN
DTL	DETAIL	REF	REFER(ENCE)
DWGS	DRAWINGS	RH	RIGHT HAND
EA	EACH	RO	ROUGH OPENING
EJ	EXPANSION JOINT	S CONC	SEALED CONCRETE
EJC	EXPANSION JOINT COVER	SIM	SIMILAR
ELEC	ELECTRIC(AL)	SPEC	SPECIFICATION
ELEV	ELEVATOR	SS	STAINLESS STEEL
EWC	ELECTRIC WATER COOLER	STD	STANDARD
EXIST	EXISTING	STL	STEEL
EXT	EXTERIOR	STOR	STORAGE
FD	FLOOR DRAIN	STRUCT	STRUCTURAL
FEB	FIRE EXTINGUISHER & BRACKET	TOS	TOP OF STEEL
FEC	FIRE EXTINGUISHER CABINET	TYP	TYPICAL
FT	FOOT (FEET)	UNO	UNLESS NOTED OTHERWISE
FV	FIELD VERIFY	VCT	VINYL COMPOSITION TILE
GA	GAUGE	VERT	VERTICAL
GALV	GALVANIZED	VIF	VERIFY IN FIELD
GC	GENERAL CONTRACTOR	W/	WITH
GYP	GYPSUM	W/O	WITHOUT
GYP BD	GYPSUM WALLBOARD	WD	WOOD

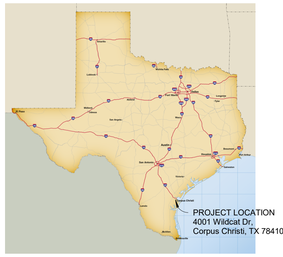
MATERIAL LEGEND

- BRICK
- CONCRETE
- CONCRETE MASONRY UNIT
- EARTH
- GLASS
- GYPSUM WALLBOARD
- LOOSE / BATT INSULATION
- METAL
- PLYWOOD
- RIGID INSULATION
- WOOD BLOCKING
- FINISH WOOD
- CAST STONE

SYMBOLS

- A0 / A0.0 — BUILDING SECTION REFERENCE
- A0 / A0.0 — INTERIOR ELEVATION REFERENCE
- RESTROOM ACCESSORY REFER FLOOR PLANS FOR SCHEDULE
- P1 — MATERIAL REFERENCE REFER TO MATERIAL SCHEDULE
- A — WINDOW TYPE REFER TO SHEET A7.1 FOR ADDITIONAL INFORMATION
- A100 — DOOR NUMBER REFER TO SHEET A7.1 FOR ADDITIONAL INFORMATION
- A0 / A0.0 — ENLARGED PLAN/ DETAIL REFENCE
- 14 — WALL TYPE REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION

PROJECT LOCATION



PROJECT LOCATION
4001 Wildcat Dr,
Corpus Christi, TX 78410



PROJECT LOCATION
Phil Danaher Stadium
4001 Wildcat Dr, Corpus Christi, TX 78410

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STATE OF TEXAS

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11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
CALALLEN INDEPENDENT SCHOOL DISTRICT
4001 Wildcat Dr., Corpus Christi, TX 78410

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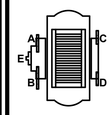
DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
COVER SHEET

SHEET NUMBER
G1.1

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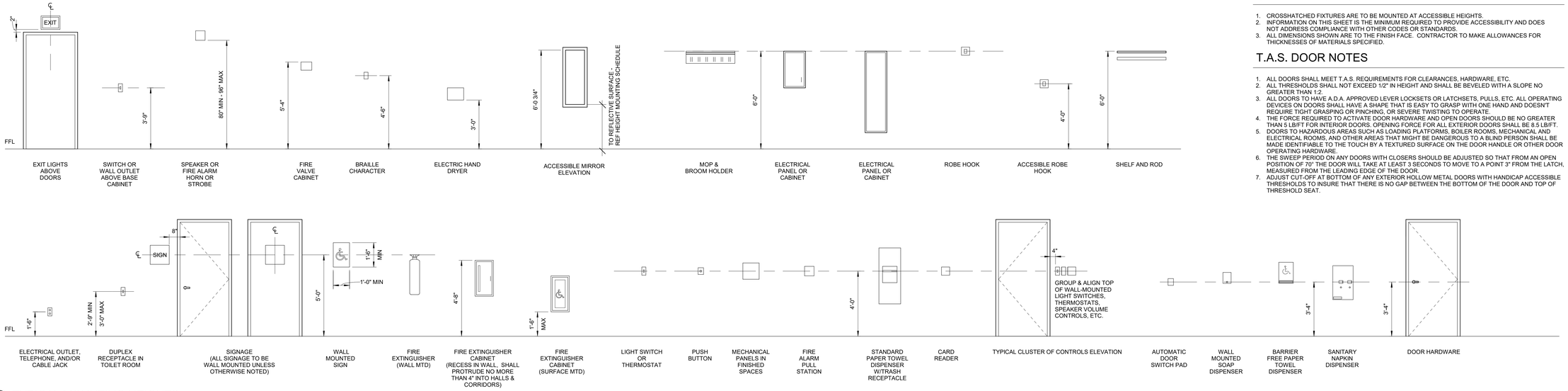
GENERAL NOTES

1. CROSSHATCHED FIXTURES ARE TO BE MOUNTED AT ACCESSIBLE HEIGHTS.
2. INFORMATION ON THIS SHEET IS THE MINIMUM REQUIRED TO PROVIDE ACCESSIBILITY AND DOES NOT ADDRESS COMPLIANCE WITH OTHER CODES OR STANDARDS.
3. ALL DIMENSIONS SHOWN ARE TO THE FINISH FACE. CONTRACTOR TO MAKE ALLOWANCES FOR THICKNESSES OF MATERIALS SPECIFIED.

T.A.S. DOOR NOTES

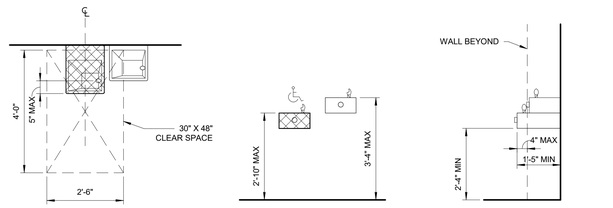
1. ALL DOORS SHALL MEET T.A.S. REQUIREMENTS FOR CLEARANCES, HARDWARE, ETC.
2. ALL THRESHOLDS SHALL NOT EXCEED 1/2" IN HEIGHT AND SHALL BE BEVELED WITH A SLOPE NO GREATER THAN 1:2.
3. ALL DOORS TO HAVE A.D.A. APPROVED LEVER LOCKSETS OR LATCHSETS, PULLS, ETC. ALL OPERATING DEVICES ON DOORS SHALL HAVE A SHAPE THAT IS EASY TO GRASP WITH ONE HAND AND DOESN'T REQUIRE TIGHT GRASPING OR PINCHING, OR SEVERE TWISTING TO OPERATE.
4. THE FORCE REQUIRED TO ACTIVATE DOOR HARDWARE AND OPEN DOORS SHOULD BE NO GREATER THAN 5 LB/FT FOR INTERIOR DOORS. OPENING FORCE FOR ALL EXTERIOR DOORS SHALL BE 8.5 LB/FT.
5. DOORS TO HAZARDOUS AREAS SUCH AS LOADING PLATFORMS, BOILER ROOMS, MECHANICAL AND ELECTRICAL ROOMS, AND OTHER AREAS THAT MIGHT BE DANGEROUS TO A BLIND PERSON SHALL BE MADE IDENTIFIABLE TO THE TOUCH BY A TEXTURED SURFACE ON THE DOOR HANDLE OR OTHER DOOR OPERATING HARDWARE.
6. THE SWEEP PERIOD ON ANY DOORS WITH CLOSERS SHOULD BE ADJUSTED SO THAT FROM AN OPEN POSITION OF 70° THE DOOR WILL TAKE AT LEAST 3 SECONDS TO MOVE TO A POINT 3" FROM THE LATCH, MEASURED FROM THE LEADING EDGE OF THE DOOR.
7. ADJUST CUT-OFF AT BOTTOM OF ANY EXTERIOR HOLLOW METAL DOORS WITH HANDICAP ACCESSIBLE THRESHOLDS TO INSURE THAT THERE IS NO GAP BETWEEN THE BOTTOM OF THE DOOR AND TOP OF THRESHOLD SEAT.



K1 TYPICAL MOUNTING HEIGHTS

NOTE: ALL HEIGHTS ARE AS INDICATE UNLESS OTHERWISE NOTED

3/8" = 1'-0"



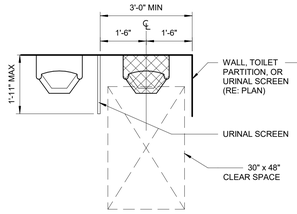
TYPICAL PLAN

TYP FRONT ELEVATION

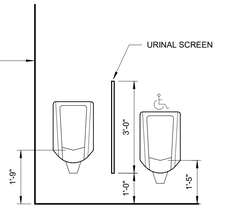
TYP SIDE ELEVATION

G1 TYPICAL DRINKING FOUNTAIN

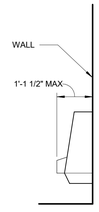
1/2" = 1'-0"



TYPICAL PLAN



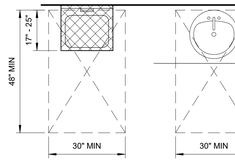
TYPICAL FRONT ELEVATION



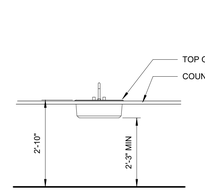
TYP SIDE ELEVATION

G6 TYPICAL URINAL LAYOUT

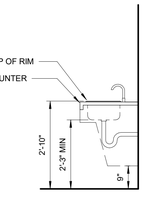
1/2" = 1'-0"



TYPICAL PLAN



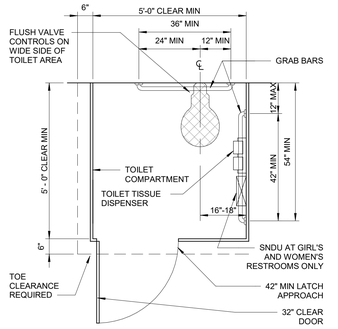
TYPICAL FRONT ELEVATION



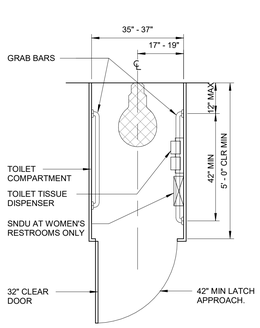
TYP SIDE ELEVATION

G12 TYPICAL LAVATORY

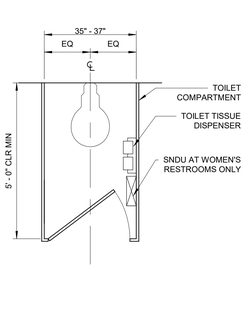
1/2" = 1'-0"



TYPICAL END OF ROW ACCESSIBLE STALL



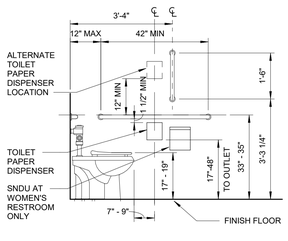
TYPICAL AMBULATORY STALL



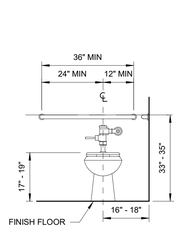
TYPICAL STANDARD STALL

D1 TYPICAL STANDARD TOILET STALL LAYOUTS

1/2" = 1'-0"



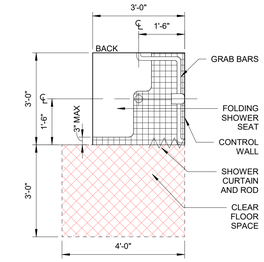
ACCESSIBLE STALL SIDE VIEW



ACCESSIBLE STALL FRONT VIEW

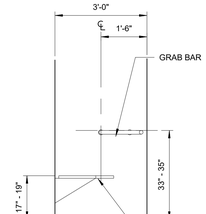
D8 TYPICAL STANDARD STALL MOUNTING HEIGHTS

1/2" = 1'-0"

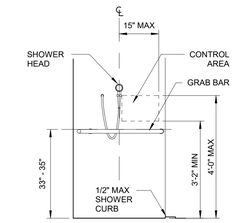


NOTE: THE MOUNTING DEVICE FOR THE HAND-HELD SHOWER HEAD SHALL COMPLY WITH FORWARD REACH RANGES

TYPICAL ACCESSIBLE TRANSFER STALL SHOWER PLAN



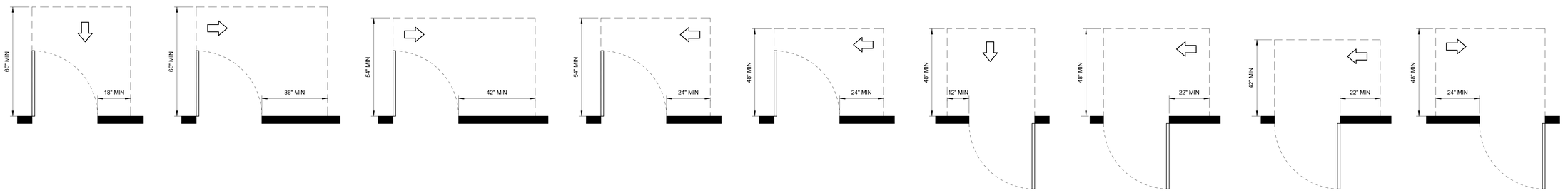
ACCESSIBLE TRANSFER SHOWER



ACCESSIBLE TRANSER SHOWER CONTROL WALL ELEV

D12 TYPICAL SHOWER

1/2" = 1'-0"



A1 TYPICAL DOOR CLEARANCES

1/2" = 1'-0"

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www.rmaarch.com

WILLIAM BERGER
REGISTERED ARCHITECT
REGISTRATION NO. 19288
STATE OF TEXAS

11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

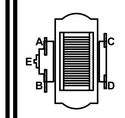
4001 Wildcat Dr., Corpus Christi, TX 78410

©2025 RMA ARCHITECTS

DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
ADA DETAILS AND MOUNTING HEIGHTS

SHEET NUMBER
G1.2

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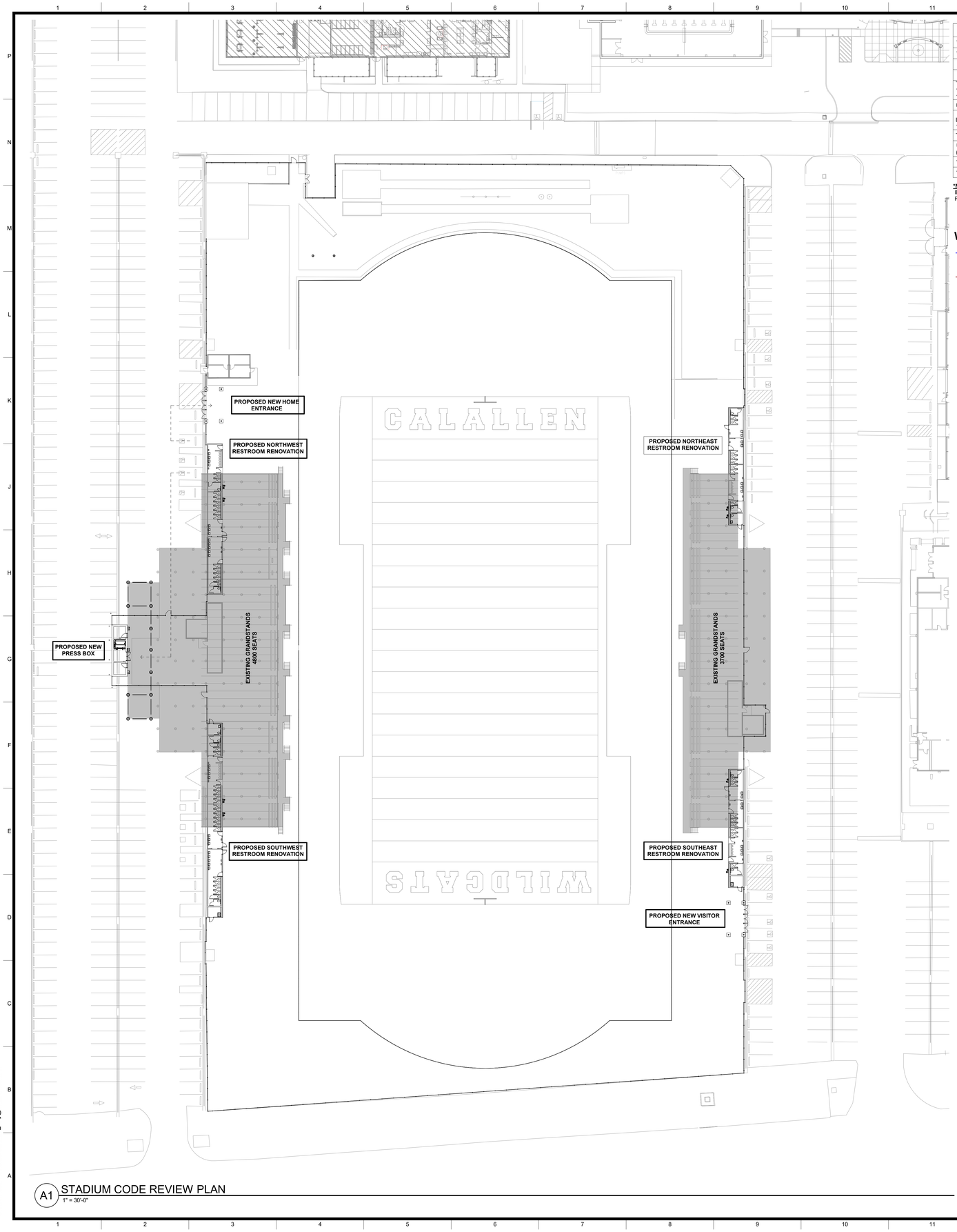


A1 STADIUM CODE REVIEW PLAN
1" = 30'-0"

PLUMBING COUNT

TYPE OF OCCUPANCY: ASSEMBLY (A5)

TOTAL No OCCUPANTS: 8500

No OF MALES: 4250 | No OF FEMALES: 4250

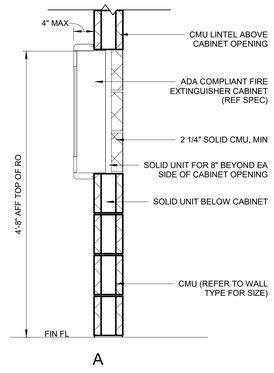
	REQD	PROVIDED		REQD	PROVIDED
TLTS 1:75 - FIRST 1500 OCC 1:120 - REMAINING OCC	43	20	TLTS 1:40 - FIRST 1520 OCC 1:60 - REMAINING OCC	84	38
URINALS-67%	[-]	20			
LAVS 1:200	21	15	LAVS 1:150	28	26
TOTAL FIXTURES	64	55		112	64
UNISEX REQUIREMENTS (1110.2.1): (1 FOR # OF FIXTURES >6)	2 REQUIRED; 2 PROVIDED				
1:1000 EWC's	REQUIRED 9 ; PROVIDED 16				
1 SERVICE SINK	REQUIRED 1 ; PROVIDED 2				

NOTE: ADDITIONAL REQUIRED FIXTURES SHALL BE USED FROM ADJACENT BUILDINGS PER INITIAL MEETING WITH CITY OF CORPUS CHRISTI DEVELOPMENT SERVICES ON JULY 31, 2025 REFER TO CAMPUS PLAN FOR LOCATIONS.

WALL RATING LEGEND

1 HR FIRE PARTITION TO DECK
NCMA-TEK 7-1A FIRE RESISTANCE AT CMU

2 HR FIRE WALL TO DECK
NCMA-TEK 7-1A FIRE RESISTANCE AT CMU
UL NO. 905



G12 FIRE EXTINGUISHER CABINET DETAIL
1" = 1'-0"

PROJECT GENERAL INFORMATION

PROJECT	HIGH SCHOOL STADIUM IMPROVEMENTS
LOCATION	4001 WILDCAT DRIVE, CORPUS CHRISTI, TEXAS, 78410
BUILDING HEIGHT - PRESS BOX	56'-9" (TWO STORIES)
FLOOR AREA E SUMMARY - PRESS BOX	LEVEL 1: 404 SF LEVEL 2: 2,326 SF TOTAL = **2,730 SF**
FLOOR AREA A SUMMARY - NORTHWEST RESTROOMS	EXISTING: 728 SF ADDITION: 447 SF TOTAL = **1,175 SF**
FLOOR AREA B SUMMARY - SOUTHWEST RESTROOMS	EXISTING: 728 SF ADDITIONS: 790 SF TOTAL = **1,518 SF**
FLOOR AREA C SUMMARY - NORTHEAST RESTROOMS	EXISTING: 493 SF ADDITIONS: 423 SF TOTAL = **916 SF**
FLOOR AREA D SUMMARY - SOUTHEAST RESTROOMS	EXISTING: 495 SF ADDITIONS: 427 SF TOTAL = **927 SF**

CODE REVIEW: IBC 2021

PRIMARY OCCUPANCY (SEC. 303.6)	ASSEMBLY "A5"
AUTOMATIC SPRINKLER SYSTEM	NO
TYPE OF CONSTRUCTION (TABLE 601)	TYPE II-B
BUILDING AREA AND HEIGHT LIMITATIONS (TABLE 506.2) GROUP A OCCUPANCY (A5)	UL

EGRESS REQUIREMENTS: IBC 2021

REQUIRED EGRESS WIDTH:

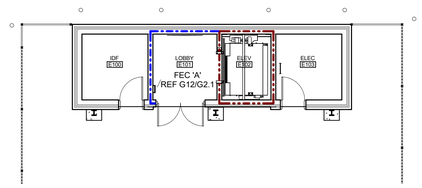
MINIMUM CORRIDOR WIDTH (TABLE 1020.2)	44" MIN OR .2" PER OCCUPANT WHICHEVER IS GREATER 72" MIN (EDUCATIONAL WITH OCCUPANCY 100 OR MORE)
MINIMUM STAIR WIDTH (TABLE 1005.3.1, EXC 1)	44" MIN OR .2" PER OCCUPANT WHICHEVER IS GREATER
NUMBER OF EXITS REQUIRED (SEC 1016)	
1-49 OCCUPANTS	1
50-500 OCCUPANTS	2
501-1000 OCCUPANTS	3
1001 OR MORE OCCUPANTS	4
MAXIMUM TRAVEL DISTANCE TO AN EXIT (TAB 1017.2)	
OCCUPANCY A, E, F-1, M, R, S-1	250' - W/ AUTO FIRE SUPPRESSION 200' - W/O AUTO FIRE SUPPRESSION
OCCUPANCY B	300' - W/ AUTO FIRE SUPPRESSION 200' - W/O AUTO FIRE SUPPRESSION
MAXIMUM LENGTH OF DEAD END CORRIDORS (1020.4, EXC 2 & 3)	50' IN GROUP 'B' & 'E' OCC. W/ AUTO FIRE SUPPRESSION 20' OR 2.5 TIMES THE LEAST WIDTH OF THE CORRIDOR
EXITS THROUGH ADJOINING ROOMS (1016.2)	PERMITTED AT ACCESSORY, NON-HI-HAZARD ROOMS W/ A DECERNABLE PATH OF TRAVEL PROVIDED; NOT PERMITTED THROUGH KITCHENS, STORAGE, OR SIMILAR

OCCUPANCY LOADS: (TABLE 1004.1.2)

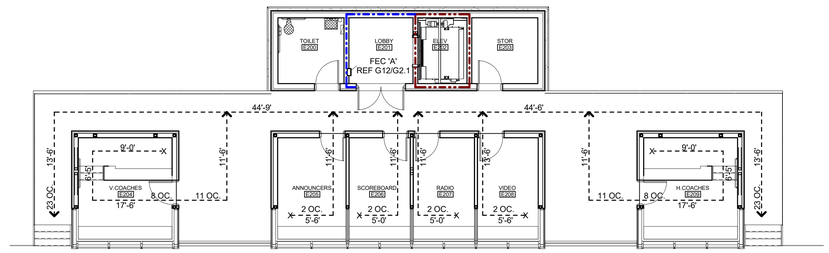
FUNCTION OF SPACE:	SQ. FT PER OCCUPANT:
ACCESSORY STORAGE AREAS, MECH. EQUIPMENT ROOMS	300 GROSS
ASSEMBLY W/OUT FIXED SEATS:	
CONCENTRATED (CHAIRS ONLY)	7 NET
UNCONCENTRATED (TABLES AND CHAIRS)	15 NET
BUSINESS AREAS	100 GROSS
CLASSROOMS	20 NET
SHOPS AND VOCATIONAL ROOMS (SCIENCE CLASS, BAND HALL)	50 NET
EXERCISE ROOMS	50 NET
KITCHENS (COMMERCIAL)	200 GROSS
LOCKER ROOMS	50 NET
STAGES AND PLATFORMS	15 NET

MISCELLANEOUS DETAILED REQUIREMENTS

CEILING HEIGHT FOR MEANS OF EGRESS (SEC 1208.2)	7'-6" MIN
STAIRS (SEC 1011.3)	6'-8" MIN
CEILING HEIGHT FOR OCCUPIABLE SPACES AND CORRIDORS (SEC 1208.2)	7'-6" MIN
SAFETY GLAZING MISCELLANEOUS REQUIREMENT	SEC 2406
ELEVATOR MISCELLANEOUS REQUIREMENTS	CHAPTER 30



D12 ENLARGED LEVEL 1 PRESS BOX PLAN
1/8" = 1'-0"



A12 ENLARGED PRESS BOX LEVEL PLAN
1/8" = 1'-0"

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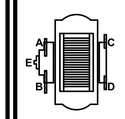

PLAN NORTH | TRUE NORTH

SHEET NAME
CODE INFORMATION AND OVERALL CODE PLAN

SHEET NUMBER
G2.1

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Texas 811 Know what's below. Call before you dig.

PARTICIPANTS REQUEST 48 HOURS NOTICE BEFORE YOU DIG, DRILL, OR BLAST. STOP AND CALL 811

CIVIL SHEET INDEX	
Sheet Number	Sheet Title
C1.0	CIVIL COVER & GENERAL NOTES
C2.1	GENERAL DIMENSION PLAN
C2.2	GRADING PLAN
C2.3	STORM WATER PLAN
C2.4	DRAINAGE PLAN
C3.1	STORM WATER POLLUTION PREVENTION PLAN
C4.1	PAVING DETAILS
C4.2	STORM WATER DETAILS

THE CITY OF CORPUS CHRISTI STANDARD DETAILS LISTED BELOW HAVE BEEN SELECTED BY MICHAEL C. YORK, P.E., TEX. REG. NO. 124938, AS BEING APPLICABLE TO THIS PROJECT.

CITY OF CORPUS CHRISTI STANDARDS INDEX:

STORM WATER POLLUTION PREVENTION PLAN NOTES, SHEET 1 OF 3
STORM WATER ENVIRONMENTAL PERMITS ISSUED AND COMMENTS (EPIC), SHEET 2 OF 3
STORM WATER POLLUTION PREVENTION PLAN STANDARD DETAILS, SHEET 3 OF 3

NOTE:
CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE MOST CURRENT VERSION OF ABOVE LISTED CITY STANDARDS FROM THE CITY OF CORPUS CHRISTI. CITY STANDARDS LISTED ABOVE ARE PART OF THE CONSTRUCTION DOCUMENTS.

GENERAL NOTES:

PRELIMINARY MATTERS
1. THE INSTRUCTIONS GIVEN BY THE NOTES ON THIS SHEET DO NOT CONSTITUTE SEPARATE PAY ITEMS UNLESS SPECIFICALLY INCLUDED IN THE PROPOSAL FORM.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS LISTED IN THE CONTRACT DOCUMENTS AND THE STANDARD DETAILS INCLUDED OR REFERENCED IN THE PLANS.
3. ANY CHANGES OR REVISIONS TO THESE PLANS MUST BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
4. THE OWNER/ENGINEER RESERVE THE RIGHT TO MAKE REASONABLE ADJUSTMENTS IN LINE AND/OR GRADE IN ORDER TO AVOID CONFLICTS WITH NON-RELOCATABLE STRUCTURES OR OTHER UTILITIES. THE CONTRACTOR AGREES TO MAKE SUCH REASONABLE ADJUSTMENTS AT NO COST TO OWNER OR ENGINEER.
5. EXISTING PAVING, BUILDINGS, AND OTHER ITEMS SHOWN ON PLANS BUT NOT SPECIFICALLY RELATED TO THE WORK OF THE CONTRACTOR ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY BE SHOWN TO A LESSER ACCURACY OR TO A LESSER DEGREE OF DETAIL THAN THE REMAINDER OF THE PLANS.

DEMOLITION
1. ALL CONSTRUCTION SHALL CONFORM TO STANDARD BUILDING CODE AND CITY ORDINANCES FOR DEMOLITION OF STRUCTURES, SAFETY OF ADJACENT STRUCTURES, DUST CONTROL AND DISPOSAL AS WELL AS ALL FEDERAL, STATE, AND LOCAL HAULING AND DISPOSAL REGULATIONS. CONTRACTOR SHALL OBTAIN REQUIRED PERMITS FROM AUTHORITIES AND NOTIFY AFFECTED UTILITY COMPANIES BEFORE STARTING WORK AND COMPLY WITH THEIR REQUIREMENTS.
2. THE CONTRACTOR SHALL COMPLETELY REMOVE EXISTING STRUCTURES WHICH ARE TO BE ABANDONED TO A DEPTH OF 36 INCHES BELOW FINISHED GRADE. STRUCTURES FALLING WITHIN A BUILDING PAD EXCAVATION SHALL BE REMOVED. ANY REMAINING CAVITY SHALL BE COMPLETELY FILLED WITH LIMESTONE OR SELECT FILL MATERIAL.
3. ALL LINES, PIPES AND UTILITIES LESS THAN 12 INCHES IN DIAMETER MAY BE ABANDONED IN PLACE PROVIDED THEY ARE AT LEAST 24 INCHES BELOW EXISTING OR PROPOSED GRADE IN SITEWORK PARKING AREAS. ALL PIPES, UTILITIES, ETC., ABANDONED IN PLACE SHALL BE GROUT FILLED AND PLUGGED OR CAPPED PER CITY CODE AND THE CITY OR APPROPRIATE UTILITY COMPANY NOTIFIED TO INSURE THAT THE SERVICE IS TERMINATED.
4. THE CONTRACTOR SHALL COMPLETELY REMOVE AND HAUL OFF EXISTING CONCRETE OR FOUNDATION PIERS THAT MAY BE UNCOVERED IN THE AREA AND FILL EXCAVATIONS WITH LIMESTONE OR SELECT FILL MATERIAL.
5. BURIAL OF DEBRIS SHALL NOT BE ALLOWED. THE CONTRACTOR SHALL HAUL OFF AND DISPOSE OF ALL DEMOLISHED ITEMS AND DISPOSE OF IN A LEGAL MANNER.

SIDEWALKS AND DRIVEWAYS
1. DRIVEWAY TYPE SHALL BE AS SHOWN ON THE APPROPRIATE CITY DETAILS AS APPLICABLE. CONTRACTOR IS RESPONSIBLE FOR VERIFYING CURRENT CITY REGULATIONS GOVERNING DRIVEWAY TYPE.
2. ALL STREET DIMENSIONS SHOWN ON PLANS ARE TO BACK OF CURB, UNLESS NOTED OTHERWISE.
3. WHERE EXISTING ASPHALT AND CONCRETE ARE TO BE CUT, THESE CUTS SHALL BE VERTICAL AND MADE WITH A SAW.
4. CARE SHALL BE TAKEN TO PROTECT CURB & GUTTER AND OTHER CONCRETE SURFACES FROM ASPHALT SPLATTER DURING PRIMING AND SEALING OPERATIONS.
5. HMAC PAVING TRANSITIONS TO EXISTING PAVEMENTS SHALL BE TRANSITIONED OVER 10' TO PRODUCE A SMOOTH RIDE AND SHALL BE CHECKED WITH A 10' STRAIGHT EDGE PRIOR TO COMPLETION. LONGITUDINAL HMAC PAVING JOINT LOCATIONS SHALL BE APPROVED BY THE ENGINEER.
6. CONCRETE PLACEMENT SHALL STOP AT EXPANSION JOINTS IN SIDEWALKS OR AS OTHERWISE DIRECTED BY THE ENGINEER.
7. WHERE PROPOSED CONCRETE TIES INTO EXISTING CONCRETE, CONTRACTOR SHALL PLACE AN EXPANSION JOINT AS SHOWN IN THE PAVING DETAILS.
8. CURB FOR CURB RAMPS SHALL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO CURB RAMP.
9. THE AREA BETWEEN THE SIDEWALK AND CURB & GUTTER SHALL BE GRADED WITH TOP SOIL THAT IS FREE OF DEBRIS, BASE, ASPHALT, AND CONCRETE AS DIRECTED BY THE ENGINEER.
10. WHEN MATCHING NEW 6" CURB & GUTTER TO EXISTING 4" CURB, THE GUTTER SLOPE SHALL BE MAINTAINED AND THE 2" TRANSITION SHALL BE IN THE CURB SECTION, AS NECESSARY TO PREVENT PONDING WATER. TRANSITION LENGTH SHALL BE 10' MINIMUM.
11. AN ASPHALT IMPREGNATED FIBERBOARD EXPANSION JOINT WITH 2-#4 DOWELS x 18" LONG SHALL BE USED WHERE NEW CURB MATCHES EXISTING.

UTILITIES
1. ELEVATION ADJUSTMENTS FOR NEW MANHOLES AND VALVES SHALL BE CONSIDERED SUBSIDIARY UNLESS NOTED OTHERWISE.
2. ALL NEW AND EXISTING VALVES AND MANHOLES SHALL BE EXTENDED TO FINISH GRADE. THIS ACTIVITY WILL BE CONSIDERED SUBSIDIARY UNLESS NOTED OTHERWISE.
3. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO PROTECT EXISTING UTILITIES. ALL PIPES AND UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED WITH NO SEPARATE PAYMENT.
4. ALL OPEN EXCAVATION SHALL BE ENCLOSED WITH ORANGE SAFETY FENCE AND BARRELS PER CURRENT SAFETY REGULATIONS.
5. ALL MATERIAL AND LABOR FOR THE ADJUSTMENT TO FINISH GRADE OF ALL NEW MANHOLES AND VALVE BOXES SHALL BE FURNISHED BY THE CONTRACTOR AND NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.
6. UNLESS SHOWN OTHERWISE IN THE PLANS OR SPECIFICATIONS, DEWATERING OF UTILITY LINE AND STORM SEWER WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO THE ITEMS IT MAY BE ASSOCIATED WITH.
7. ALL ASBESTOS-CEMENT PIPE DESIGNATED FOR REMOVAL SHALL BE DISPOSED OF IN STRICT ACCORDANCE WITH LOCAL, STATE & FEDERAL REGULATIONS. DISPOSAL OF AC PIPE WILL NOT BE PAID DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO UTILITY OR DEMOLITION IMPROVEMENTS.
8. UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND WERE OBTAINED FROM EXISTING RECORDS AND VISIBLE EVIDENCE ON THE GROUND. IT IS EXPECTED THAT THERE MAY BE SOME DISCREPANCIES AND OMISSIONS IN THE LOCATIONS AND QUANTITIES OF EXISTING UTILITIES AND STRUCTURES SHOWN. THE CONTRACTOR SHALL VERIFY THE DEPTH AND LOCATION OF ALL KNOWN EXISTING UTILITIES SUFFICIENTLY IN ADVANCE OF CONSTRUCTION SO THAT CONFLICTS CAN BE AVOIDED. WHEN AN EXISTING UTILITY OR UNDERGROUND PIPELINE IS ENCOUNTERED, THAT WAS PREVIOUSLY NOT LOCATED OR INCORRECTLY LOCATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND THE APPROPRIATE UTILITY COMPANY TO OBTAIN PROCEDURAL INSTRUCTIONS. THE CONTRACTOR SHALL COOPERATE WITH THE APPROPRIATE UTILITY COMPANY IN MAINTAINING ACTIVE SERVICES IN OPERATION.
9. ADJUSTMENT OF EXISTING UTILITIES WHICH CONFLICT WITH PROPOSED UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. SAID ADJUSTMENT SHALL BE COORDINATED WITH THE APPROPRIATE UTILITY AFFECTED AND SHALL BE PERFORMED IN THE PRESENCE OF OFFICIALS OF THE AFFECTED UTILITY AND TO THE AFFECTED UTILITIES STANDARDS AND SPECIFICATIONS. THERE SHALL BE NO SEPARATE PAYMENT FOR SAID ADJUSTMENTS, EXCEPT WHERE SPECIFICALLY DESIGNATED IN THE PLANS.
10. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND REPAIRING ANY UTILITIES DAMAGED AS A RESULT OF OPERATIONS.
11. ALL PIPELINE VALVES SHALL BE ACCESSIBLE AT ALL TIMES.
12. PAVEMENT REPAIR SHALL BE PAID FOR ONLY IF THE REPAIR OCCURS OUTSIDE THE LIMITS OF PROPOSED STREET EXCAVATION.
13. TRENCH RESTORATION, ALONG EXISTING PAVEMENTS THAT ARE SCHEDULED FOR SUBSEQUENT STREET EXCAVATION, SHALL INCLUDE REPLACEMENT OF BASE WITH LOW P.I. MATERIAL THAT IS CONDUCTIVE FOR SALVAGE.
14. WHERE UTILITY AND/OR STORM SEWER WORK IS PERFORMED UNDER AREAS OF THE EXISTING ROADWAY OR TEMPORARY DETOURS THAT ARE REQUIRED TO CARRY TRAFFIC PRIOR TO COMPLETION OF THE STREET IMPROVEMENTS, THE CONTRACTOR SHALL APPLY SURFACE TREATMENT ON TOP OF THE BASE OR BACKFILL MATERIAL UNTIL SUCH TIME THAT THE PROPOSED PAVEMENT SECTION IS CONSTRUCTED. THESE TEMPORARY PAVEMENTS (INCLUDING BACKFILL, BASE MATERIAL AND SURFACE TREATMENT) WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE SUBSIDIARY TO THE BID ITEM TRAFFIC CONTROL.
15. PVC PIPE AND FITTINGS FOR SEWER LINES SHALL BE IN ACCORDANCE WITH ASTM D-3034. PIPE SHALL HAVE AN SDR OF 26. PIPE AND FITTINGS SHALL HAVE PUSH-ON COMPRESSION GASKET JOINTS IN ACCORDANCE WITH ASTM D-3212.
16. PVC PIPE AND FITTINGS FOR WATER LINES SHALL BE A.W.W.A. C-900, CLASS 150, WITH A D.R. OF 18.
17. "FH ASSEMBLY" SHALL ENCOMPASS ALL PIPE, FITTINGS, AND STRUCTURES NECESSARY TO COMPLETE THE FIRE HYDRANT INCLUDING THE TEE ON THE MAIN LINE AND THE VALVE ON THE LEAD LINE. FIRE HYDRANTS WILL BE LOCKED ONTO VALVE BY USE OF RETAINER GLANDS ON DUCTILE IRON PIPE.
18. ALL CURB INLETS SHALL HAVE A 5' THROAT, UNLESS NOTED OTHERWISE.
19. ALL STORM SEWER PIPE SHALL BE CLASS III REINFORCED CONCRETE PIPE WITH TYPE B WALL AND TONGUE-AND-GROOVE JOINTS PER ASTM C-76-20 OR CORRUGATED HDPE DUAL WALL PIPE MANUFACTURED IN ACCORDANCE WITH ASTM F2306/F2306M-19 AND WITH GASKETED WATER TIGHT JOINTS MEETING ASTM D3212-07(2020) UNLESS NOTED OTHERWISE ON THE DRAWINGS. CLASS IV REINFORCED CONCRETE PIPE SHALL BE USED WHERE TOP OF PIPE EXTENDS INTO SUBGRADE OR BASE COURSE.
20. PRE-CAST INLETS, SHALL HAVE CAST-IN-PLACE THROAT AND TOP.
21. A PIPE COLLAR SHALL BE USED WHERE PROPOSED STORM SEWER IS TO BE CONNECTED TO EXISTING STORM SEWER. PIPE COLLARS SHALL NOT BE PAID FOR SEPARATELY BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS. PIPE COLLARS SHALL NOT BE REQUIRED AT TONGUE AND GROOVE CONNECTIONS.
22. ALL CONCRETE PIPE AND BOX JOINTS SHALL REQUIRE PREFORMED PLASTIC SEALING COMPOUND AND JOINT WRAP.
23. ALL CONNECTIONS AND ADJUSTMENTS TO EXISTING GAS LINES SHALL BE PERFORMED BY THE GAS UTILITY PROVIDER AS REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE GAS UTILITY PROVIDER AND IS RESPONSIBLE FOR PAYING ALL COSTS ASSOCIATED WITH CONNECTIONS OR ADJUSTMENTS.
24. ALL WATER LINES AND FITTINGS 12-INCHES AND SMALLER SHALL HAVE RESTRAINED JOINTS.
25. ALL MANHOLES IN LOCATIONS SUBJECT TO VEHICULAR TRAFFIC SHALL BE HS-20 TRAFFIC RATED.
26. TYPICAL MINIMUM DEPTH OF WATER LINES SHALL BE 36-INCHES TO TOP OF PIPE AND TYPICAL MAXIMUM DEPTH UNDER PAVEMENT SHALL BE 48-INCHES TO TOP OF PIPE.
27. All WATER LINES AND FITTINGS 12-INCHES AND SMALLER SHALL HAVE RESTRAINED JOINTS.
28. WATER LINES SHALL BE INSTALLED WITH LOCATOR TAPE AND TRACER WIRE IN ACCORDANCE WITH LOCAL STANDARDS.

MISCELLANEOUS
1. CONCRETE SHALL BE SAW CUT WHERE AN EXISTING CONCRETE STRUCTURE IS TO BE PARTIALLY REMOVED.
2. TREE TRIMMING SHALL BE DONE IN ACCORDANCE WITH STANDARD HORTICULTURAL PRACTICE. TREES, TREE STUMPS AND BRUSH WITHIN THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHALL BE REMOVED AND HAULED AWAY.
3. PRIMING AND HOT-MIX PLACING OPERATIONS SHALL NOT BE CONDUCTED ON DAYS FOR WHICH AN OZONE ADVISORY HAS BEEN ISSUED, EXCEPT FOR REPAIRS.
4. REMOVAL OF EXISTING FENCE, IN AREAS TO RECEIVE NEW FENCE, WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS, UNLESS OTHERWISE INDICATED. THE CONTRACTOR SHALL PROVIDE A TEMPORARY FENCE FROM THE TIME AN EXISTING FENCE IS REMOVED TO THE TIME THE PROPOSED FENCE IS REPLACED. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
5. ALL WORK SHALL BE PERFORMED DURING DAYLIGHT HOURS.
6. ALL TRASH SHALL BE PICKED-UP AND REMOVED AT THE END OF EACH DAY.
7. CONTRACTOR SHALL VERIFY ALL SURFACE CONDITIONS OF THE SITE PRIOR TO PREPARING AND SUBMITTING ITS BID.
8. WHERE THE WORD "PROPOSED" OR PROP." IS UTILIZED IN THIS SET OF DOCUMENTS, IT SHALL MEAN "NEW CONSTRUCTION TO BE PERFORMED AS PART OF THIS CONTRACT."
9. FLOWABLE GROUT MATERIAL SHALL BE "DARAFILL" ADMIXTURE MANUFACTURED BY GRACE CONSTRUCTION PRODUCTS OR APPROVED EQUAL. THE FLOWABLE GROUT SHALL BE SUPPLIED WITH A MIXUTE CONTAINING 100lbs/CY PORTLAND CEMENT, 250lbs/CY WATER, 300lbs/CY FLY ASH, 2100lbs/CY SAND, AND 6oz/CY DARAFILL. MIXTURE SHALL BE PROVIDED BY AN APPROVED READY-MIX SUPPLIER. THE MANUFACTURER'S REPRESENTATIVE SHALL BE CONSULTED FOR ANY FINAL ADJUSTMENTS TO IMPROVE FOR FLOWABILITY OF THE MIXTURE.

TRAFFIC
1. IF CONTRACTOR DISTURBS TRAFFIC BY OCCUPYING TRAFFIC LANES WITH CONSTRUCTION EQUIPMENT OR DELIVERY VEHICLES CONTRACTOR IS RESPONSIBLE FOR ACQUIRING APPROVAL OF A TRAFFIC CONTROL PLAN PERMIT FROM THE CITY TRAFFIC ENGINEER AND IT MUST BE IN CONFORMANCE WITH CURRENT "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (TMUTCD). THIS INCLUDES THE CONSTRUCTION OF DRIVEWAYS AND CURB & GUTTER IN PUBLIC RIGHT OF WAYS.
2. ALL WEATHER VEHICULAR ACCESS TO LOCAL RESIDENTS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
3. THE CONTRACTOR SHALL MAINTAIN AND PROVIDE SUITABLE TEMPORARY DRAINAGE UNTIL SUCH TIME AS PERMANENT DRAINAGE STRUCTURES ARE COMPLETED. THE EXPENSE FOR PROVIDING SAID SUITABLE TEMPORARY DRAINAGE, INCLUDING CONSTRUCTION OF TEMPORARY SWALES, INSTALLATION AND REMOVAL OF TEMPORARY PIPES AND OTHER ASSOCIATED WORK WILL NOT TO BE PAID FOR SEPARATELY BUT SHALL BE SUBSIDIARY.
4. THE CONTRACTOR SHALL COORDINATE WITH THE CITY TRAFFIC ENGINEERING DEPARTMENT REGARDING RELOCATION OR REPLACEMENT OF EXISTING SIGNS (STOP SIGNS, BUS ROUTE SIGNS, ETC.) AS MAY BE REQUIRED.

NOTIFICATION REQUIREMENTS
1. AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION THE CONTRACTOR IS REQUIRED TO NOTIFY TEXAS 811 AT 1-800-344-8377.
2. THE CONTRACTOR SHALL GIVE A MINIMUM OF 48 HOURS NOTICE TO THE OWNER, ENGINEER, AND PERSONS IN CHARGE OF PRIVATE AND PUBLIC UTILITIES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK.
3. THE CONTRACTOR SHALL NOTIFY LOCAL EMERGENCY SERVICES (I.E. FIRE, E.M.S., AND POLICE) OF ANY CONSTRUCTION ACTIVITIES THAT WOULD AFFECT THE NORMAL FLOW OF TRAFFIC.
4. THE CONTRACTOR SHALL GIVE A MINIMUM OF 48 HOURS NOTICE TO THE ENGINEER AND AUTHORIZED TESTING LABORATORY PRIOR TO REQUIRED TESTS.

CONTRACTOR'S RESPONSIBILITIES
1. THE CONTRACTOR SHALL COORDINATE ALL SERVICE SHUT DOWNS WITH THE APPROPRIATE UTILITY DEPARTMENT CONSTRUCTION OBSERVER AT LEAST 48 HOURS PRIOR TO THE ANTICIPATED UTILITY SERVICE SHUT DOWN.
2. THE CONTRACTOR SHALL COORDINATE WITH ALL AFFECTED PROPERTY OWNERS IN WRITING AT LEAST 24 HOURS PRIOR TO ANY ANTICIPATED UTILITY SERVICE SHUT DOWN. THE CONTRACTOR SHALL PROVIDE THE CITY WITH A COPY OF ALL WRITTEN CORRESPONDENCE.
3. THE CONTRACTOR SHALL COORDINATE INSPECTIONS WITH THE UTILITY DEPARTMENT INSPECTOR 48 HOURS PRIOR TO ALL WORK BEING COVERED.
4. THE CONTRACTOR SHALL ADVISE THE OWNER AND THE ENGINEER IMMEDIATELY, VERBALLY AND IN WRITING, OF ANY FUEL OR TOXIC MATERIAL SPILLS ONTO THE PROJECT/CONSTRUCTION AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISPOSING OF FUELS, WASTE MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER.
5. THE CONTRACTOR SHALL COORDINATE INTERRUPTIONS OF ALL UTILITIES AND SERVICES WITH APPLICABLE UTILITY COMPANY, OWNER, AND TENANT. ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY COMPANY OR AGENCY INVOLVED.
6. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING INGRESS AND EGRESS FOR ALL PUBLIC AND PRIVATE FACILITIES AT ALL TIMES AND FOR ALL WEATHER CONDITIONS. UNLESS OTHERWISE INDICATED ON THE PLANS OR APPROVED BY THE ENGINEER.
7. THE CONTRACTOR SHALL BE REQUIRED TO PROVIDED AND MAINTAIN ALL NECESSARY WARNING AND SAFETY DEVICES (FLASHING LIGHTS, FLAG MEN, BARRICADES, SIGNS, ETC.) TO PROTECT THE PUBLIC SAFETY AND HEALTH UNTIL THE WORK HAS BEEN COMPLETED AND ACCEPTED BY THE ENGINEER AND OWNER. ALL BARRICADING SHALL BE DONE IN COMPLIANCE WITH THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
8. THE CONTRACTOR SHALL MAINTAIN ALL REGULATORY SIGNS DURING THE CONSTRUCTION PERIOD.
9. THE CONTRACTOR SHALL ASSURE HIMSELF THAT ALL CONSTRUCTION PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCEMENT OF WORK. REQUIRED PERMITS THAT CAN ONLY BE ISSUED TO CONTRACTOR ARE TO BE OBTAINED AT THE CONTRACTOR'S EXPENSE.
10. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAINING SANITARY FACILITIES ON THIS PROJECT FOR EMPLOYEES.
11. THE CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE FLOW IN ALL DITCHES AND STORM SEWER AT ALL TIMES.
12. THE CONTRACTOR SHALL PLACE AND COMPACT BACKFILL AS PROMPTLY AND PRACTICABLE AS POSSIBLE AFTER COMPLETION AT EACH STRUCTURE OR PORTION OF A STRUCTURE.
13. PRIOR TO THE ACCEPTANCE OF THE PROJECT, ALL GRADED AND DISTURBED AREAS ARE TO BE RESTORED TO ORIGINAL OR BETTER CONDITION IN ACCORDANCE WITH THE SPECIFICATIONS. DISTURBED AREAS OUTSIDE LANDSCAPED AREAS SHALL BE SEEDED, FERTILIZED, AND STABILIZED PER TxDOT ITEMS 164 (URBAN SEED MIX) AND 166.
14. THE CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF ALL EXCESS CONSTRUCTION AND WASTE MATERIALS. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS REGARDING THE HANDLING AND DISPOSAL OF EXCESS AND WASTE MATERIALS.
15. ALL CONSTRUCTION OPERATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH APPLICABLE REGULATIONS OF THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA). COPIES OF OSHA STANDARDS MAY BE PURCHASED FROM THE U.S. GOVERNMENT PRINTING OFFICE.
16. THE CONTRACTOR SHALL TAKE ALL DUE PRECAUTIONS TO PROTECT EXISTING FACILITIES (INCLUDING ROADWAYS, PARKING AREAS, DRIVEWAYS, STRUCTURES, UTILITIES, ETC.) FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF THE CONSTRUCTION OPERATIONS ARE TO BE REPAIRED IMMEDIATELY BY THE CONTRACTOR TO A CONDITION SIMILAR OR EQUAL TO THAT EXISTING BEFORE THE DAMAGE WAS DONE. REPAIRS SHALL BE MADE TO THE SATISFACTION OF THE FACILITY OWNER AND THE ENGINEER AT THE CONTRACTOR'S EXPENSE.
17. THE CONTRACTOR SHALL LOCATE, PROTECT AND MAINTAIN BENCHMARKS, MONUMENTS AND CONTROL POINTS. THE CONTRACTOR SHALL RE-ESTABLISH DISTURBED OR DESTROYED ITEMS AT HIS EXPENSE. THE RE-ESTABLISHMENT SHALL BE PERFORMED UNDER THE DIRECTION OF A TEXAS REGISTERED PROFESSIONAL LAND SURVEYOR.
18. IF EXISTING ELECTRICAL LINES ARE LOCATED CLOSE TO THE PROJECT THE CONTRACTOR SHALL ADHERE TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS CONCERNING OPERATIONS IN THE VICINITY OF ELECTRICAL LINES AND THE NEED FOR EFFECTIVE PRECAUTIONARY MEASURES.
19. WHERE WATER LINES AND SEWER LINES ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES PARALLELING WASTEWATER LINES OR WATER LINES NEXT TO MANHOLE(S), THE INSTALLATION WILL MEET THE REQUIREMENTS OF 30 TAC 317.13, APPENDIX E (DESIGN CRITERIA PRIOR TO 2008), 30 TAC 217.53 (CONVENTIONAL COLLECTION SYSTEMS), AND 30 TAC 290.44(e) (WATER HYGIENE).
20. WATER NECESSARY FOR CONSTRUCTION SHALL BE PROVIDED AND PAID FOR BY THE CONTRACTOR. THE CONTRACTOR SHALL ARRANGE FOR A METERED CONNECTION(S) AND SHALL PROVIDE THE PROPER EQUIPMENT TO PREVENT CROSS-CONNECTION.
21. IN ACCORDANCE WITH THE TEXAS DEPARTMENT OF LICENSING & REGULATION (TDLR) REQUIREMENTS, ENGINEER WILL SUBMIT THESE PLANS, AS MAY BE REQUIRED, TO A REGISTERED ACCESSIBILITY SPECIALIST (RAS) FOR REVIEW OF COMPLIANCE WITH TEXAS ACCESSIBILITY STANDARDS (TAS). FINAL INSPECTION BY RAS IS REQUIRED PRIOR TO ACCEPTANCE OF PROJECT BY OWNER. CONTRACTOR IS RESPONSIBLE FOR CORRECTING ANY IMPROVEMENTS WHICH ARE OUT OF COMPLIANCE WITH TAS. CONTRACTOR IS NOT RESPONSIBLE FOR EXISTING IMPROVEMENTS WHICH ARE NOT DISTURBED.
3. CONTRACTOR SHALL MARK ALL APPROVED CHANGES IN RED ON FIELD DRAWINGS AND DELIVER RED LINES TO ENGINEER UPON CONSTRUCTION COMPLETION FOR THE PURPOSES OF PRODUCING RECORD DRAWINGS.

SURVEY
1. HORIZONTAL CONTROL BASED ON GPS, NAD83, STATE PLANE COORDINATE SYSTEM, TEXAS SOUTH ZONE 4205.
2. VERTICAL CONTROL IS BASED ON NAVD88.

CITY OF CORPUS CHRISTI
1. CITY OF CORPUS CHRISTI CONSTRUCTION SPECIFICATIONS ARE TO BE USED ON THIS PROJECT FOR ANY PUBLIC IMPROVEMENTS.
2. CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION OF THE CITY OF CORPUS CHRISTI CONSTRUCTION INSPECTION DEPARTMENT AT 361-826-3240 AT LEAST THREE WORKING DAYS IN ADVANCE OF COMMENCING ANY WORK ON PUBLIC IMPROVEMENTS OR TYING INTO ANY PUBLIC FACILITIES.
3. CONTRACTOR SHALL MARK ALL APPROVED CHANGES IN RED ON FIELD DRAWINGS AND DELIVER RED LINES TO ENGINEER UPON CONSTRUCTION COMPLETION FOR THE PURPOSES OF PRODUCING RECORD DRAWINGS.
4. A PERMIT IS REQUIRED FOR ANY EXCAVATION WITHIN THE PUBLIC RIGHT-OF-WAY. EXCAVATION MEANS AN ACTIVITY THAT CUTS, PENETRATES, OR BORES UNDER ANY SURFACE FOR STREET, SIDEWALK, SURFACE DRAINAGE, OR RELATED PUBLIC TRANSPORTATION INFRASTRUCTURE PURPOSES, PERMITS WILL NOT BE ISSUED FOR EXCAVATION IN ANY PUBLIC RIGHT-OF-WAY THAT HAS BEEN CONSTRUCTED, RECONSTRUCTED, REPAVED, OR RESURFACED IN THE PRECEDING FIVE YEARS FROM THE DATE OF ACCEPTANCE BY THE PUBLIC WORKS CONSTRUCTION ENTITY.
5. ALL CONSTRUCTION PROCEDURES, TESTING PROCEDURES AND CONSTRUCTION MATERIALS AND APPURTENANCES SHALL ADHERE AND BE IN COMPLIANCE OF THE LATEST REVISIONS OF THE CITY OF CORPUS CHRISTI INFRASTRUCTURE DESIGN MANUAL, UNIFIED DEVELOPMENT CODE, CODE OF ORDINANCES, TCEQ AND ANY OTHER LOCAL, STATE AND FEDERAL CODE OF JURISDICTION OF THIS PROJECT FOR THE DURATION OF THE PROJECT.
6. THESE PLANS HAVE BEEN DEVELOPED AND ENGINEERED TO MEET ALL LOCAL, COUNTY, STATE AND FEDERAL CODES INCLUDING BUT NOT LIMITED TO THE LATEST ADOPTION OF THE IDM, CODE OF ORDINANCES CITY OF CORPUS CHRISTI, ICC, TCEQ AT THE TIME OF SIGNING AND SEALING BY ENGINEER.
7. THIS PROJECT REQUIRES INSPECTION BY A REGISTERED ACCESSIBILITY SPECIALIST (RAS) FOR COMPLIANCE WITH TAS/ADA REQUIREMENTS. CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH RAS TO ALLOW FOR INSPECTIONS AS REQUIRED. PROJECT ARCHITECT IS RESPONSIBLE FOR PROJECT REGISTRATION AND CLOSE OUT PAPERWORK.

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MICHAEL C. YORK 124938 LICENSED PROFESSIONAL ENGINEER
11 NOVEMBER 2025
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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
Calallen Independent School District

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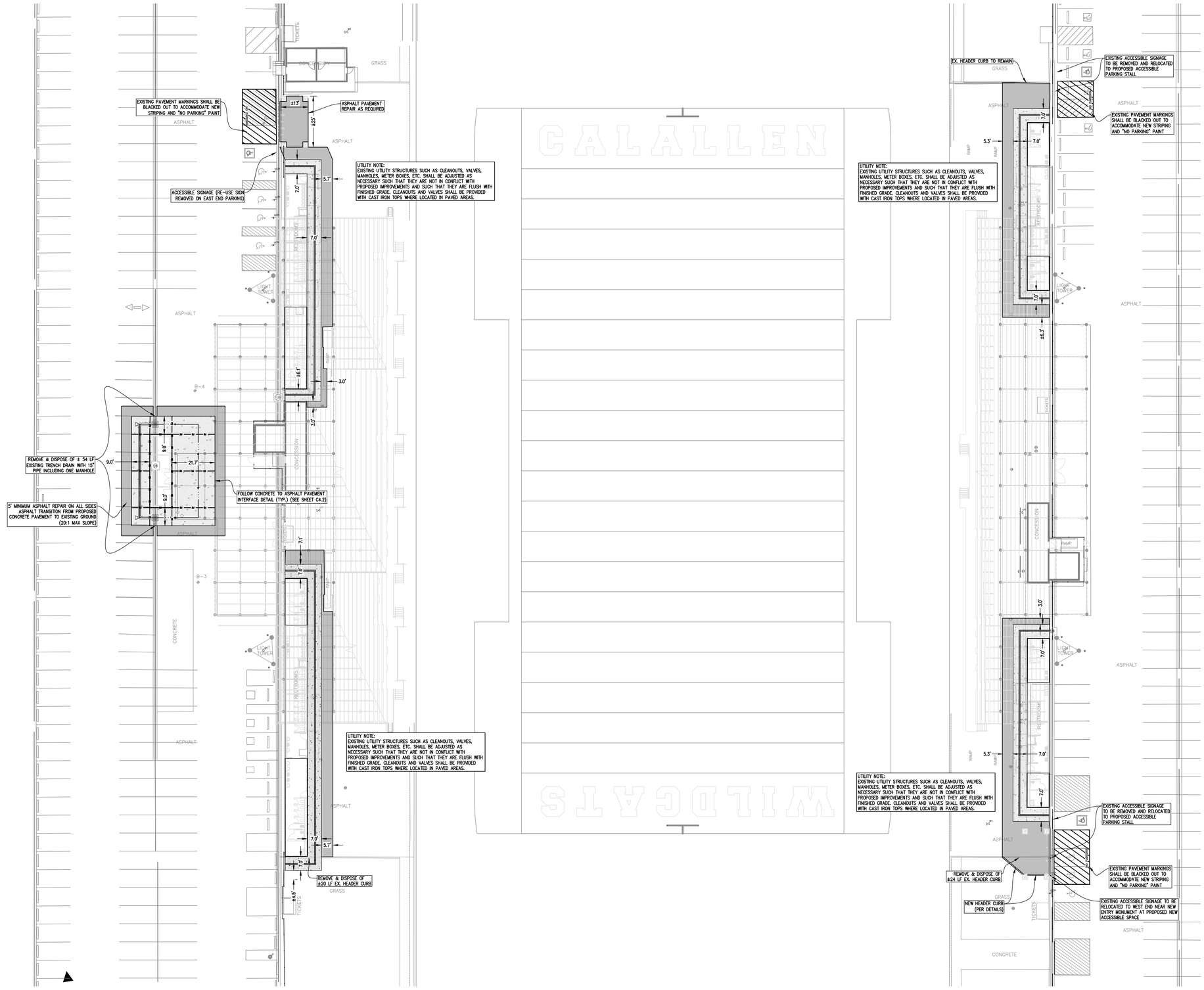
DATE ISSUED:
11.NOV.2025

PROJECT NUMBER:
1092-0325

SHEET NAME
CIVIL COVER & GENERAL NOTES

SHEET NUMBER
C1.0



0 10 20 40
GRAPHIC SCALE
1"=20'

LEGEND

- LIGHT DUTY CONCRETE PAVEMENT
- CONCRETE SIDEWALK
- ASPHALT PAVEMENT
- EXPANSION JOINT

NOTES:
1. CONTRACTION JOINTS SHALL BE SAWED WITHIN 12 HOURS OF CONCRETE POUR TO A DEPTH OF 1/4 OVERALL CONCRETE PAVEMENT THICKNESS.
2. CONTRACTION JOINTS SHALL GENERALLY BE SPACED 5 FEET APART.

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

Calallen Independent School District

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PROJECT NUMBER:
1092-0325

SHEET NAME
GENERAL DIMENSION PLAN

SHEET NUMBER
C2.1

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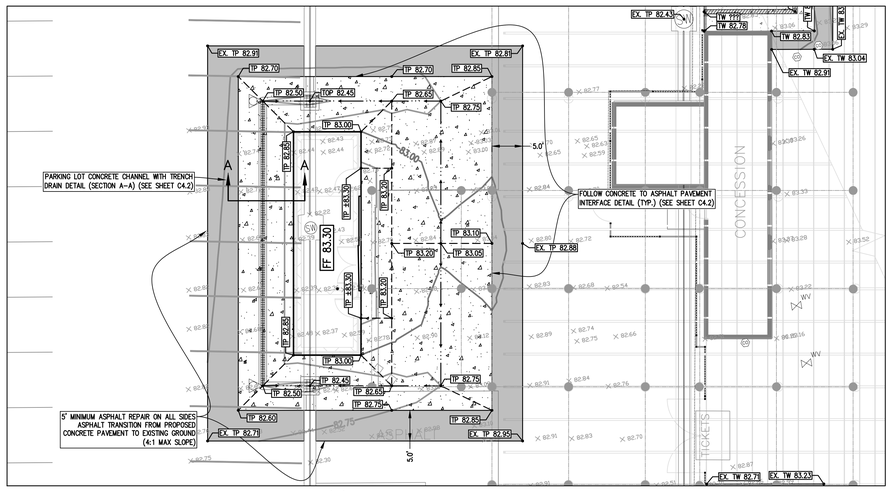
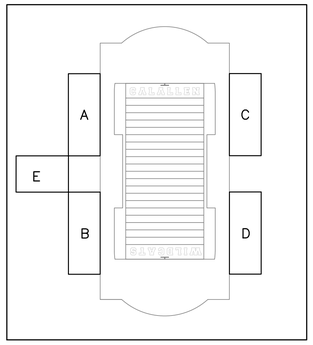
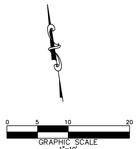


AREA 'E' – PRESS BOX ADDITION



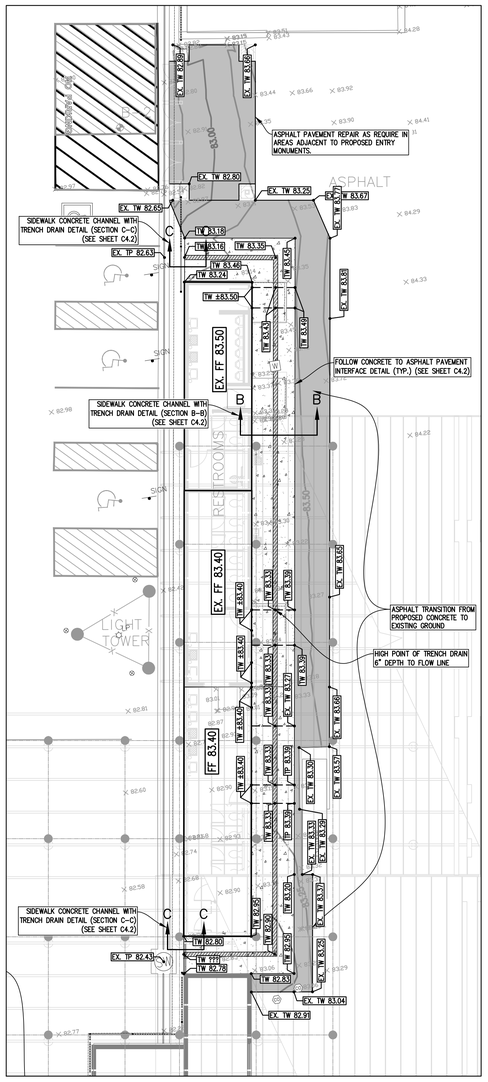
KEY MAP



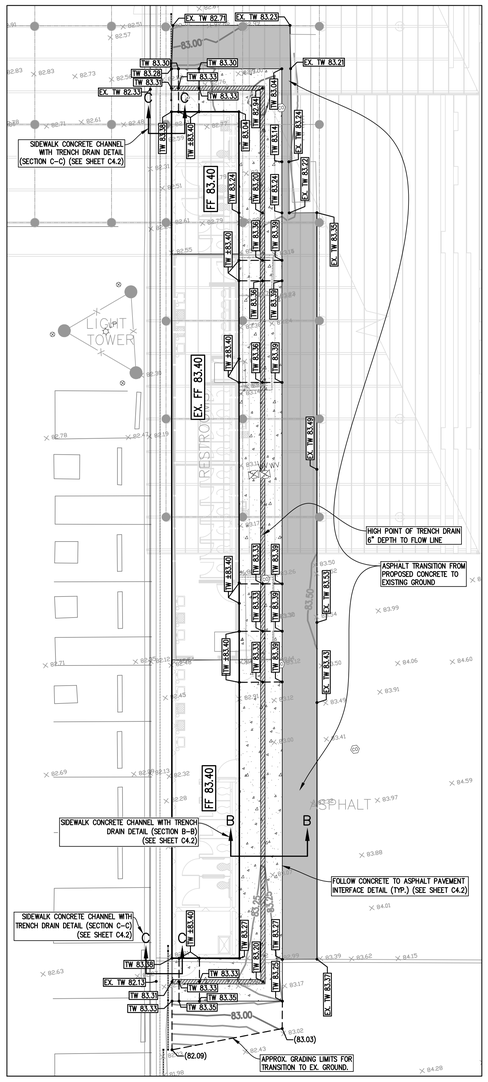
LEGEND

EX.	EXISTING
TP	TOP OF PAVEMENT
TW	TOP OF WALK
FF	FINISHED FLOOR
8.00	EXISTING CONTOUR
8.00	PROPOSED CONTOUR
	EXISTING CONCRETE
	CONCRETE SIDEWALK
	GRADE BRAKE
	DRAINAGE SWALE
+29.4' (83.58)	EXISTING SPOT ELEVATION
TP 10.00	PAVEMENT SPOT ELEVATION
10.00	GROUND SPOT ELEVATION

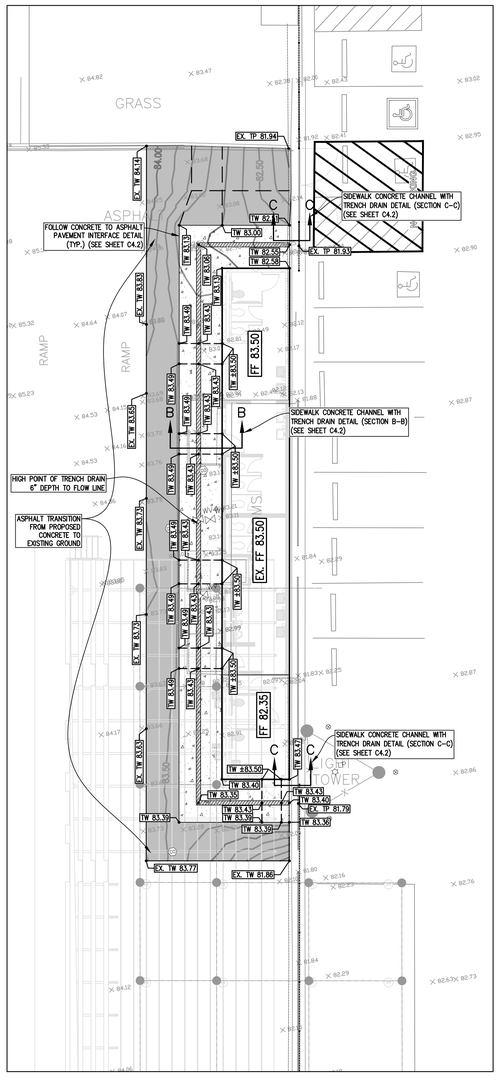
NOTE:
DISTURBED AREAS OUTSIDE LANDSCAPED AREAS SHALL BE SEEDED, FERTILIZED AND STABILIZED PER TxDOT ITEMS 164 (URBAN SEED MIX) AND 166.



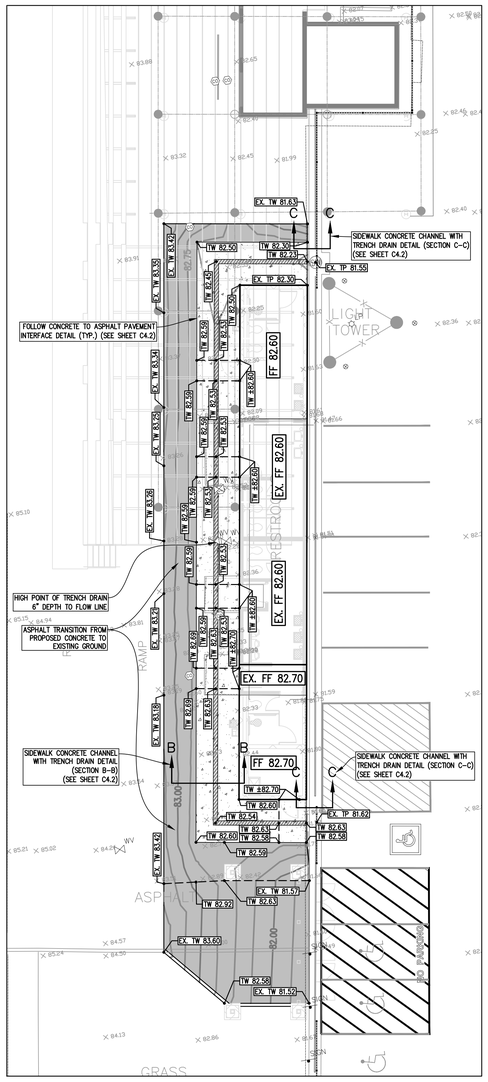
AREA 'A' – NW RESTROOMS



AREA 'B' – SW RESTROOMS



AREA 'C' – NE RESTROOMS



AREA 'D' – SE RESTROOMS

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11 NOVEMBER 2025

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
Callallen Independent School District

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SHEET NAME
GRADING PLAN

SHEET NUMBER
C2.2

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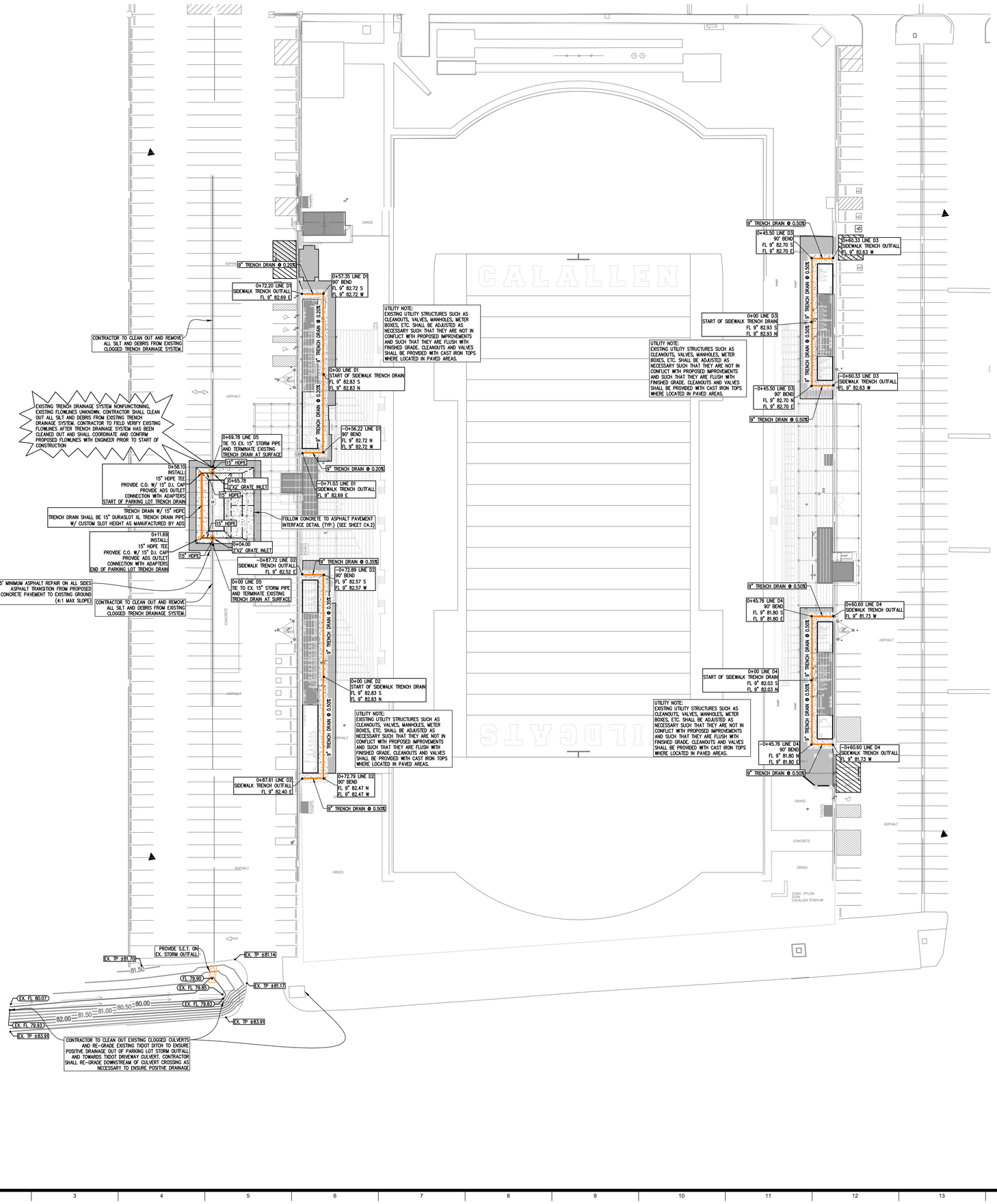

0 15 30 60
GRAPHIC SCALE
1"=30'

LEGEND

EX.	EXISTING
SS	SANITARY SEWER
MH	MANHOLE
PVC	POLYVINYL CHLORIDE
HDPE	HIGH DENSITY POLYETHYLENE
RCP	REINFORCED CONCRETE PIPE
GI	GRATE INLET
FL	FLOW LINE
(W)	EX. WATER LINE
(SS)	EX. SANITARY SEWER LINE
(STO)	EXISTING STORM DRAINAGE LINE
	EXISTING FIRE HYDRANT
	STORM DRAINAGE LINE
	STORM TRENCH DRAIN
	GRATE INLET (GI)

NOTE:
CONTRACTOR TO VERIFY SIZE, LOCATION, DEPTH, AND MATERIAL OF ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION AND NOTIFY ENGINEER OF ANY DISCREPANCIES.

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
Calallen Independent School District

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PROJECT NUMBER:
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SHEET NAME
STORM WATER PLAN

SHEET NUMBER
C2.3

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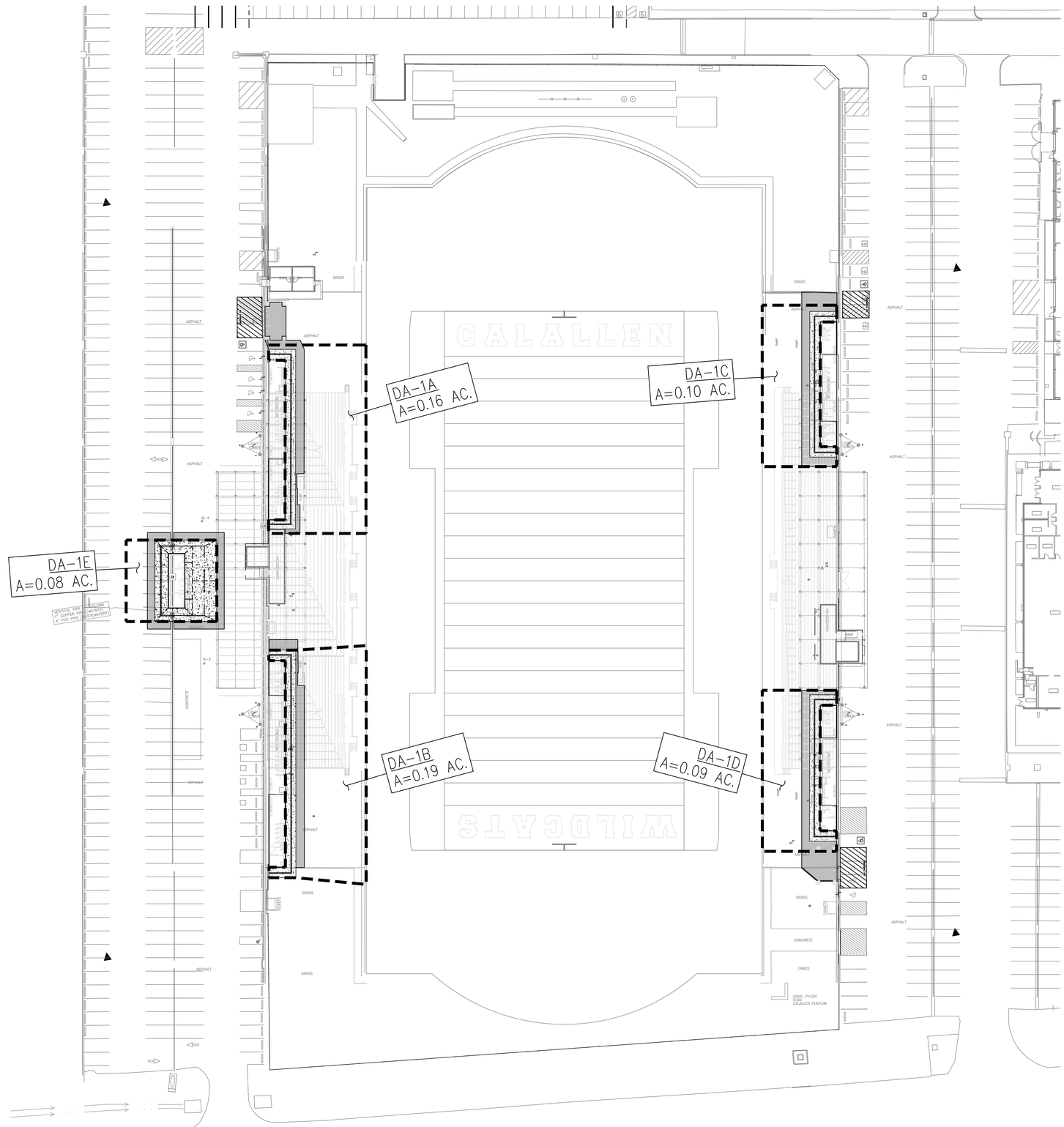

0 15 30 60
GRAPHIC SCALE
1"=30'

LEGEND

	DRAINAGE AREA BOUNDARY
	DRAINAGE SWALE
	PROPOSED FLOW ARROW
DA	DRAINAGE AREA
A	AREA
C	RUN-OFF COEFFICIENT
Tc	TIME OF CONCENTRATION
i_{10}	RAINFALL INTENSITY (10-YEAR)
Q_{10}	FLOW RATE (10-YEAR)

DRAINAGE NOTES:

THE SUBJECT PROJECT AREA IS CURRENTLY FULLY DEVELOPED AS A STADIUM AND ASSOCIATED INFRASTRUCTURE WITH PAVED PARKING. THE DEVELOPMENT WILL CONSTRUCT NEW RESTROOM ADDITIONS TO EXISTING BUILDINGS AND A NEW PRESS BOX.

THE SITE CURRENTLY SURFACE DRAINS TO EXISTING TRENCH DRAINS LOCATED WITHIN THE PROPERTY. DEVELOPMENT WILL GENERALLY MAINTAIN THE EXISTING DRAINAGE PATTERNS.

DRAINAGE CALCULATIONS FOR THIS PROJECT ARE BASED ON THE CURRENT CITY OF CORPUS CHRISTI DRAINAGE MASTER PLAN AS WELL AS THE INFRASTRUCTURE DESIGN MANUAL.

FOR PURPOSES OF DETERMINING THE COEFFICIENT OF RUNOFF, NEIGHBORHOOD BUSINESS DISTRICT WAS CHOSEN FOR BOTH PRE AND POST DEVELOPMENT A MINIMUM TIME OF CONCENTRATION (Tc) OF 10 MINUTES IS ASSUMED. THE RAINFALL INTENSITIES SELECTED ARE BASED OFF THE NOAA ATLAS 14 POINT PRECIPITATION RAINFALL INTENSITY FOR CORPUS CHRISTI, TEXAS.

THIS DEVELOPMENT COMPLIES WITH THE CITY'S MASTER DRAINAGE PLAN AND THE PROPOSED DRAINAGE WILL NOT ADVERSELY AFFECT THE DRAINAGE PATTERN OR DESIGN OF THE ADJACENT PROPERTIES.

RUN-OFF CALCULATIONS

PRE-DEVELOPMENT	POST-DEVELOPMENT
DA-1A A=0.16 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=0.89 cfs	DA-1A A=0.16 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=0.89 cfs
DA-1B A=0.19 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=1.06 cfs	DA-1B A=0.19 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=1.06 cfs
DA-1C A=0.10 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=0.56 cfs	DA-1C A=0.10 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=0.56 cfs
DA-1D A=0.09 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=0.50 cfs	DA-1D A=0.09 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=0.50 cfs
DA-1F A=0.08 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=0.45 cfs	DA-1F A=0.08 ac. C=0.85 Tc=10 min. (minimum) i_5=6.55 in./hr. Q_5=0.45 cfs
A_t=0.62 ac. Q_t=3.46 cfs	A_t=0.62 ac. Q_t=3.46 cfs

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STATE OF TEXAS
MICHAEL C. YORK
124938
LICENSED
PROFESSIONAL ENGINEER
11 NOVEMBER 2025
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MICHAEL C. YORK, P.E. 124938. ALTERATION OF A SEALED DOCUMENT WITHOUT PROPER NOTIFICATION OF THE RESPONSIBLE ENGINEER IS A VIOLATION OF THE TEXAS ENGINEERING PRACTICE ACT.

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
Calallen Independent School District

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DATE ISSUED:
11.NOV.2025

PROJECT NUMBER:
1092-0325

SHEET NAME
DRAINAGE PLAN

SHEET NUMBER
C2.4

YORK ENGINEERING
CIVIL • PLANNING • CONSULTING
361-245-9400 | YORKENG.COM TEXAS ENGINEERING FIRM F-22063
YORK PROJ. NO. 1119-25-01
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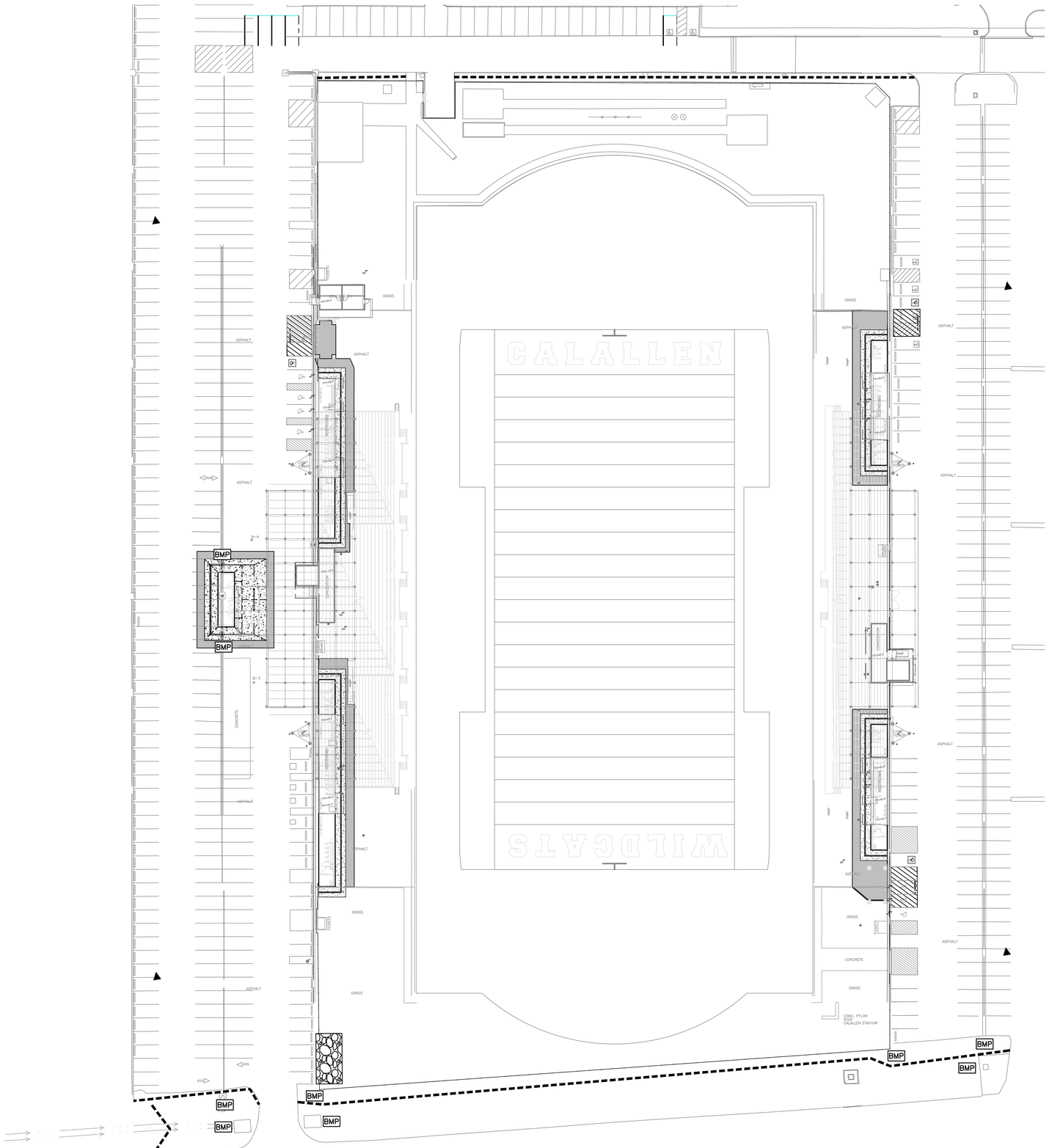



LEGEND

- 975 LF SILT FENCE
- BMP — BEST MANAGEMENT PRACTICE.
- STABILIZED CONSTRUCTION ENTRANCE

GENERAL NOTES:

1. THIS PLAN FOLLOWS THE OUTLINE PROVIDED TO MEET THE REQUIREMENTS OF STATE REGULATIONS CONCERNING STORM WATER MANAGEMENT.
2. CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING SWPPP AND MONITORING OVER THE COURSE OF THE PROJECT. CHANGES, MAINTENANCE AND UPDATING OF FEATURES AND PLANS WILL BE REQUIRED. MEASURES DEPICTED PRESENT POTENTIAL MEASURES NEEDED. CONTRACTOR SHALL MODIFY AS NECESSARY AND DOCUMENT CHANGES AS REQUIRED PER THE GENERAL CONSTRUCTION PERMIT.
3. CONTRACTOR, OR OPERATOR OF THE SITE AS DEFINED BY TCEQ, SHALL COMPLETE THE FORMS PROVIDED ON THE CITY STANDARD POLLUTION PREVENTION DETAIL SHEETS AS NEEDED FOR COMPLIANCE WITH THE GENERAL PERMIT.
4. ALL POLLUTION CONTROL MEASURES SHALL COMPLY WITH ALL REQUIREMENTS OF CITY OF CORPUS CHRISTI ORDINANCE NO. 022941, STORM WATER QUALITY MANAGEMENT PROGRAM.

SITE DESCRIPTION

A. Project Location: Calallen High School, Corpus Christi, Texas
B. Project Description: Construction of a new restroom facilities and high school stadium improvements
C. Major Soil Disturbing Activities: Site grading, utility trenching
D. Project Area: 0.62 acres
E. Total Area to be Disturbed: 0.62 acres
F. Weighted Runoff Coefficient (Post-Development): 0.85
G. Existing Condition of Soil & Vegetative Cover: Average grass surface ±90% vegetative cover
H. Name of Receiving Waters: Nueces River Basin
I. There are no special flood hazard areas or velocity zone boundaries within the site.
J. There are no known environmentally sensitive areas, natural water bodies, jurisdictional wetlands, endangered species habitat, state submerged lands, or critical dunes on the site.
I. Owner: _____
J. Construction Contractor: _____

BEST MANAGEMENT PRACTICES (BMP)

B. Erosion Controls: The existing vegetation must be preserved to the greatest extent possible. The areas disturbed by construction will be seeded to provide stabilization and prevent erosion. The stabilization measures shall be implemented as soon as practicable in portions of the site where construction activities have ceased. Stabilization practices must be implemented no later than 14 days after the construction activities in any portion of the site have ceased. The above timing for stabilization practices does not apply to the following: areas where construction activity will resume in the area within 21 days, or in arid, semi arid or drought stricken areas. In these areas the stabilization measures will take place as soon as practicable. Other erosion control measures which may be implemented include but are not limited to: Temporary Vegetation, Blankets/Matting, Mulch, Sod, Interceptor Swale, Diversion Dike, Erosion Control Compost, Mulch Filter Berms and Socks, and Compost Filter Berms and Socks.
C. Sedimentation Controls: Sedimentation controls will be implemented to retain sediment onsite and minimize offsite transport to the extent practicable. Silt fence will be installed on the slopes to prevent sediment from entering the un-named tributaries of the Nueces River and the Choke Canyon Reservoir during construction. Sediment must be removed no later than the time that the capacity of the control is reduced by 50%. If sediment escapes from the site the accumulations must be removed at a frequency so as to minimize further negative effects and whenever feasible prior to the next rain. Other sedimentation controls which may also be used include but are not limited to: Sand Bag Berm, Rock Berm, Brush Berms, Mulch Filter Berms and Socks, Compost Filter Berms and Socks, Silt Fence, Hay Bale Dike, Triangular Filter Dike, Stone Outlet Sediment Traps, Sediment Basins, and Erosion Control Compost.
D. Post-Construction TSS Control: A soil filter strip will be placed along the toe of slope of the disturbed areas in the vicinity of the un-named tributaries of the Nueces River and Choke Canyon Reservoir to reduce the total suspended solids load in the storm water runoff. Other post-construction TSS control measures which may be implemented include but are not limited to: Retention/Irrigation, Constructed Wetlands, Extended Detention Basin, Wet Basins, Vegetative Filter Strips, Vegetation Lined Drainage Ditches, Grassy Swales, Sand Filter Systems, Erosion Control Compost, Mulch Filter Berms and Socks, and Compost Filter Berms and Socks.
   1. Waste Disposal: Waste disposal must be accompanied in a manner so that no solid wastes, including building materials, hazardous substances, oil, or packaging leave the site, except for disposal at an appropriate, approved solid waste management facility, in conformance with the Texas solid waste disposal act. To the extent practicable, no solid waste, including building materials, hazardous substances, or oil may be allowed to enter the municipal separate storm sewer system, the public streets, of the navigable waters of the united states. building materials include, but are not limited to, uncovered stockpiles of soil, sand, dry cement, lumber, bricks, or other products used in construction. The operator of the site is responsible for all subcontractors with regards to disposal of wastes generated by the construction activities at the site.
   2. Waste Materials: All waste materials will be collected and stored in a securely lidded metal Dumpster rented from a reputable disposal company licensed for solid waste disposal. The Dumpster will meet all local, State and Federal solid waste management regulations. All trash and construction debris from the site will be disposed in the Dumpster. The Dumpster will be emptied as necessary and the trash hauled to a permitted waste disposal site. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedure for waste disposal. The Pollution Prevention Plan will be posted in the office trailer and the Construction Superintendent will be responsible for seeing that these procedures are followed.
   3. Hazardous Waste: All hazardous waste materials will be disposed of in the manner as required by City, State or Federal regulations or by the materials manufacturer. All personnel will be instructed regarding the correct procedure for handling hazardous waste and the Construction Superintendent will be responsible for seeing that these procedures are followed.
   4. Sanitary Waste: All sanitary waste will be collected from portable units as necessary and/or required by governing regulations. Collection will be by a licensed or permitted Disposal Company and the waste properly disposed of.
A. Offsite Vehicle Tracking: Stabilized construction entrances will be provided to help reduce vehicle tracking of sediments. The paved street adjacent to the site entrance will be swept daily to remove any excess mud, dirt, or rock tracked from the site.
B. Sprinkling for Dust Control: The Contractor shall provide water as needed to sprinkle areas in order to control and minimize the generation of dust.

MAINTENANCE & INSPECTION PROCEDURES

A. General: All erosion, sedimentation, post-construction TSS and other protective measures identified must be maintained in effective operating condition. If during the regular inspections the permittee notes that the measures are not performing as intended then maintenance must be performed before the next storm event. Any measure that has been rendered ineffective due to construction activity must be replaced or corrected immediately.
B. Maintenance and Inspection Practices for Erosion, Sedimentation and Post-Construction TSS Controls:
   1. Where possible, the site work will be performed in phases leaving certain areas undisturbed as the work progresses.
   2. All control measures will be inspected at least once each week and within 24 hours of any storm event of 0.5 inches or greater.
   3. All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report.
   4. Built up sediment will be removed from silt fence when it has reached one-third the height of the fence.
   5. Silt fence will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
   6. Earthen dikes, sediment traps and check dams will be inspected to verify they are functioning as originally constructed.
   7. Temporary and permanent seeding, planting, mulching, sod stabilization and sod filter strips will be inspected for bare spots, washouts and healthy growth.
   8. A maintenance inspection report will be made after each inspection.
   9. The Construction Superintendent will select one individual who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance report.
   10. Personnel selected for inspection and maintenance responsibilities will receive training from the Construction Superintendent. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used on site in good working order.
   11. Inspection report with certification for compliance should be retained for at least three years.

MATERIALS AND SUBSTANCES

A. The following materials or substances are expected to be present onsite during construction: Lumber, PVC pipe, Ductile iron Pipe Fittings, Concrete materials and reinforcing steel, Polyethylene pipe and products, Petroleum and asphalt products, Paint, Fertilizer, Herbicides.

MANAGEMENT PRACTICES

A. General Material Management Practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to storm water runoff. The following good housekeeping practices will be followed onsite during the construction project:
   1. An effort will be made to store only enough product required to do the job.
   2. All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
   3. Products will be kept in their original containers with the original manufacturer's label.
   4. Substances will not be mixed with one another unless recommended by the manufacturer.
   5. Whenever possible, all of a product will be used up before disposing of the container.
   6. Manufacturers' recommendations for proper use and disposal will be followed.
   7. The site superintendent will inspect daily to ensure proper use and disposal of materials onsite.
   8. Dust control shall be provided at whatever frequency required to maintain compliance with federal, state, and local ordinances and the TPDES General Permit.
B. Hazardous Products Management Practices that will be used to reduce the risks associated with hazardous materials.
   1. Products will be kept in original containers unless they are not resealable. All chemicals, paints, solvents, fertilizers, and other toxic materials must be stored in sealable waterproof containers.
   2. Except during applications, the contents must be kept in trucks or in storage facilities.
   3. Original labels and material safety data will be retained as they contain important product information.
   4. Runoff containing hazardous materials shall be collected, removed form the site, and disposed of at an approved solid waste or chemical disposal facility. If surplus product must be disposed of, manufacturers' or local and State recommended methods for proper disposal would be followed.
C. Product Specific Practices
   1. Petroleum Products: All onsite vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers, which are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.
   2. Fertilizers: Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked in the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.
   3. Herbicides: Herbicides used will be applied only in the minimum amounts recommended by the manufacturer. Applications shall be accomplished only at times when wind will not cause over spray. Storage will be in a covered shed. Partially used containers of herbicides will be tightly reseated.
   4. Paints: All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the storm sewer system but will be properly disposed of according to manufacturer's instructions or State and local regulations.
   5. Concrete Trucks: Contractor may not allow the owner of a concrete truck to wash out or discharge surplus concrete or drum wash water at a construction site, unless the surplus concrete or drum wash water in concrete trucks is discharged at a facility on the construction site that will retain all concrete wash waters or leachates, including any wash waters or leachates mixed with storm water, concrete wash waters and leachates may not be allowed to enter the municipal separate storm sewer system, public streets, waters of the unites states, or ground water. The Contractor will remove this waste material at the completion of the project.
D. Additional management practices for spill prevention and cleanup:
   1. Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and location of the information and cleanup supplies.
   2. Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
   3. All spills will be cleaned up immediately after discovery.
   4. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
   5. Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size.
   6. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.
   7. The Construction Superintendent responsible for the day-to-day site operations will be the spill prevention and cleanup coordinator. He will designate at least one other site personnel who will receive spill prevention and cleanup training; this individual will become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the office trailer onsite.

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

Calallen Independent School District

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DATE ISSUED:
11.NOV.2025

PROJECT NUMBER:
1092-0325

SHEET NAME
STORM WATER POLLUTION PREVENTION PLAN

SHEET NUMBER
C3.1

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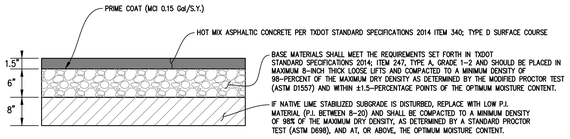
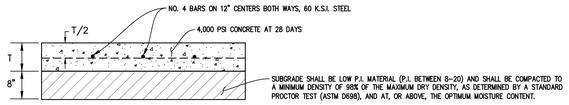


ASPHALT SECTION
N.T.S.



T = 5" WALKWAYS
T = 6" PARKING LOT

CONCRETE PAVEMENT SECTION
N.T.S.

GENERAL NOTES:
1. CONCRETE FOR PAVEMENT, BLOCK CURB, AND CURB & GUTTER SHALL BE 4000 P.S.I., ALL STEEL GRADE 60 fy= 60,000 P.S.I., MIN
2. ALL REINFORCING STEEL LAPS SHALL BE 30 BARS DIAMETERS. BAR LENGTHS SHALL BE SUCH TO PROVIDE A CLEARANCE OF AT LEAST 2" ALONG PAVEMENT EDGES AND AT JOINTS WHERE THE REINFORCING STEEL IS NOT TO BE CONTINUOUS.
3. REINFORCING STEEL SHALL BE SUPPORTED DURING CONSTRUCTION TO MAINTAIN NOT LESS THAN 3 INCHES AND NOT GREATER THAN 4 INCHES COVER FROM TOP OF SLAB.
4. EXPANSION JOINT SEALANT SHALL BE G SEAL 605 OR 628 AS MANUFACTURED BY GREENSTREAK OR APPROVED EQUAL. POLYURETHANE JOINT SEALANT MEETING THE REQUIREMENTS OF ASTM C920-87, TYPE S OR M, GRADE P, CLASS 25 USES T,M,A AND O. SHALL BE USED IN ALL CONTRACTION JOINTS AND EXPANSION JOINTS WHERE CAP SEAL IS NOT FEASIBLE. WHERE GRADE IS GREATER THAN 3% SLOPE USE BOSTIK 900 SEALANT.SEALANT NOT REQUIRED AT CAP SEAL JOINTS.
5. TRANSVERSE GROOVES 1/8" WIDE BY 1/2" DEEP SHALL BE MADE IN ALL CURB & GUTTER AND HEADER CURB AT 10' O.C. (MAXIMUM).
6. FOR ALL CURB, 3/4" THICK EXPANSION JOINTS SHALL BE PROVIDED AT 40'-0" CENTERS (MAXIMUM). REINFORCEMENT SHALL CONSIST OF THE NO. 4 DOWELS X 12" LONG SPACED AT 18" O.C. (MAX.) . THE NO. 4 DOWEL SHALL BE EXTENDED ACROSS THE JOINT 6 INCHES AND THIS END SHALL BE SLEEVED OR GREASED. EPOXY SET DOWEL WHEN CONNECTING TO EXIST. CONCRETE.
7. WHERE NEW CURB & GUTTER OR HEADER CURB JOINS EXISTING CURB & GUTTER, TRANSITION THE LAST 10' OF THE NEW TO MATCH THE OLD IN SHAPE.
8. FOR HEADER CURB NO. 4 DOWEL, MACHINE DRILL A 4" DIA. HOLE AT 4 FEET O.C. (MAX.) AFTER ASPHALT IS LAID AND COMPACTED. DOWELS SHALL NOT BE DRIVEN DIRECTLY INTO ASPHALT AS A METHOD FOR SECURING HEADER CURB TO PAVEMENT.
9. BASE AND SUBGRADE THICKNESS UNDER CONCRETE CURBS TO BE AS SPECIFIED IN PROJECT SPECIFICATIONS, AS PER LOADING DESIGN CONDITIONS. MINIMUM THICKNESS FOR FLEXIBLE BASE UNDER CURB SHALL BE 4". MINIMUM THICKNESS FOR SUBGRADE UNDER CURB SHALL MATCH SUBGRADE PER PAVEMENT SECTION.
10. BASE AND SUBGRADE SHALL EXTEND A MINIMUM OF 12" BEYOND THE BACK OF CURB OR EDGE OF PAVEMENT.
11. AT LEAST 12" OF THE AREA BEHIND THE CURB SHALL BE BACKFILLED AND COMPACTED (MINIMUM 95% STANDARD PROCTOR DENSITY) IN ACCORDANCE WITH THE SPECIFICATIONS AS SOON AS POSSIBLE AND NO LATER THAN 48 HOURS OF REMOVAL OF FORMS (OR SOONER IN THE EVENT OF INCLEMENT WEATHER).
12. FOR EXPANSION JOINTS, TERMINATE STAKES BELOW THE TOP OF THE BOARD A DISTANCE EQUAL TO THE DEPTH OF THE CAP SEAL PROFILE PLUS 1/4". USE FACTORY FABRICATIONS FOR INTERSECTIONS AND CHANGES OF DIRECTION. INSURE ALL SECTIONS TO BE SPLICED ARE CUT SQUARE AND BOUND TOGETHER USING CAP SEAL ADHESIVE.
13. SECURE CAP SEAL TO THE EXPANSION BOARD WITH STAPLES, NAILS, SCREWS (APPROXIMATELY 18" ON CENTER) OR ADHESIVE TO PREVENT DISLOCATION DURING CONCRETE PLACEMENT.
14. PLACE CONCRETE USING NORMAL PLACEMENT TECHNIQUES, UTILIZING THE CAP SEAL AS SCREED RAIL. VIBRATE CONCRETE TO INSURE GOOD CONSOLIDATION AROUND CAP SEAL.
15. DO NOT TOOL CAP SEAL JOINT. INADEQUATE STAKING-EXPANSION BOARDS THAT BOW OR TWIST DURING CONCRETE PLACEMENT WILL RESULT IN IMPROPERLY ALIGNED SEALCAP.
16. INSUFFICIENT CONCRETE AT THE CAP SEAL PROFILE-CAP SEAL SHOULD BE FLUSH OR SLIGHTLY BELOW THE FINISHED CONCRETE SURFACE. CONCRETE WILL NOT ADHERE TO THE TOP OF CAP SEAL.
17. USE A DOWEL ALIGNING DEVISE AS NEEDED TO ELIMINATE CONCERN FOR CRACKING AND SPALLING

NOTE:
ALL ACCESSIBLE STRIPING, RAMPS, AND SIGNAGE SHALL COMPLY WITH MOST CURRENT ADOPTED TEXAS ACCESSIBILITY STANDARDS (TAS).

COLORS:
LETTERS & BORDER – GREEN
BACKGROUND – WHITE
SYMBOL – WHITE ON BLUE BACKGROUND

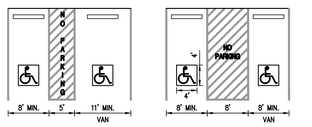
ONLY FOR VAN ACCESSIBLE SPACES (MIN. OF 1 OUT OF 6 RESERVED SPACES SHALL BE DESIGNATED VAN ACCESSIBLE AND BE SERVED BY AN AISLE AT LEAST 8' WIDE.)

COLORS:
LETTERS & BORDER – BLUE
BACKGROUND – WHITE

COLORS:
LETTERS & BORDER – WHITE
BACKGROUND – BLUE

NOTE:
ONE SIGN PER PARKING SPACE PERMANTLY MOUNTED TO POLE

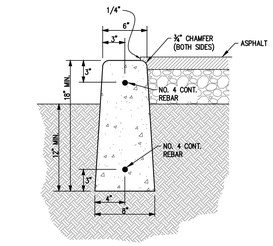
ACCESSIBLE PARKING SIGN DETAIL
N.T.S.



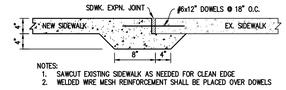
NOTE:
DIMENSIONS SHOWN ARE MINIMUM. SEE PLANS FOR ACTUAL DIMENSIONS.

ACCESSIBLE STRIPING DETAIL
N.T.S.

ACCESSIBLE, STRIPING, AND SIGNAGE NOTES:
1. ALL SLOPES ARE MAXIMUM ALLOWABLE. THE LEAST POSSIBLE SLOPE THAT WILL STILL DRAIN PROPERLY SHOULD BE USED. RAMP LENGTH OR GRADE OF APPROACH SIDEWALKS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.
2. THE MINIMUM SIDEWALK WIDTH IS 5'. WHERE A 5' SIDEWALK CAN NOT BE PROVIDED DUE TO SITE CONSTRAINTS, A MINIMUM 3' SIDEWALK WITH 5'X 5' PASSING AREAS AT INTERVALS NOT TO EXCEED 200 FT IS REQUIRED.
3. LANDINGS SHALL BE 25 S.F. MINIMUM WITH A MAXIMUM 2% SLOPE IN ANY DIRECTION.
4. MANEUVERING SPACE AT THE BOTTOM OF CURB RAMPS SHALL BE A MINIMUM OF 4'X 4' WHOLLY CONTAINED WITHIN THE CROSSWALK AND WHOLLY OUTSIDE THE PARALLEL VEHICULAR TRAVEL PATH.
5. MAXIMUM ALLOWABLE CROSS SLOPE ON SIDEWALK AND RAMP SURFACES IS 2%.
6. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP. OTHERWISE, FLARED SIDES SHALL BE PROVIDED.
7. ALL CONCRETE SURFACES SHALL RECEIVE A LIGHT BROOM FINISH UNLESS NOTED OTHERWISE IN THE PLANS.
8. RAMP TEXTURES MUST CONSIST OF TRUNCATED DOMED SURFACES FOR RAMPS WITHIN PUBLIC RIGHTS-OF-WAY AND MAY CONSIST OF TRUNCATED DOMED SURFACES OR GROOVES FOR RAMPS WITHIN PRIVATE PROPERTY. TEXTURES ARE REQUIRED TO BE DETECTABLE UNDERFOOT. SURFACES THAT WOULD ALLOW WATER TO ACCUMULATE ARE PROHIBITED.
9. ADDITIONAL INFORMATION ON CURB RAMP LOCATION, DESIGN, LIGHT REFLECTIVE VALUE AND TEXTURE MAY BE FOUND IN THE CURRENT EDITION OF THE TEXAS ACCESSIBILITY STANDARDS (TAS) PREPARED AND ADMINISTERED BY THE TEXAS DEPARTMENT OF LICENSING AND REGULATION (TDLR).
10. EXISTING FEATURES THAT COMPLY WITH TAS MAY REMAIN IN PLACE UNLESS OTHERWISE SHOWN ON THE PLANS.
11. HANDRAILS ARE NOT REQUIRED ON CURB RAMPS. CURB RAMPS SHALL BE PROVIDED WHEREVER ON ACCESSIBLE ROUTE CROSSES (PENETRATES) A CURB.
12. MAXIMUM SLOPE ON BARRIER FREE RAMPS MUST NOT EXCEED 1" PER FOOT AT ANY LOCATION. MAXIMUM CROSS SLOPE SHALL NOT EXCEED 1/4" PER FOOT.
13. CONTRACTOR IS SOLELY RESPONSIBLE FOR RAMP AND SIDEWALK CONSTRUCTION COMPLYING WITH ALL CURRENT ADA REQUIREMENTS PLUS TEXAS ACCESSIBILITY STANDARDS INCLUDING SLOPES, TEXTURE, COLOR CONTRASTS AND ELEVATIONS.
14. ALL ACCESSIBLE STRIPING, RAMPS, TEXTURES AND SIGNAGE WITHIN PRIVATE PROPERTY SHALL COMPLY WITH TEXAS ACCESSIBILITY STANDARDS. PUBLIC RAMPS SHALL COMPLY WITH AMERICAN'S WITH DISABILITIES ACT (ADA) LATEST ADDITION.
15. PARKING AREA STRIPING SHALL BE SHERWIN WILLIAMS SET FAST ACRYLIC LATEX TRAFFIC MARKING PAINT (YELLOW-TM2191, BLUE-TM2133, RED-TM2132) AND SHALL BE A TWO COAT APPLICATION YIELDING A 15 MIL FILM THICKNESS.
16. ACCESSIBLE SIGNS, SYMBOLS, ETC. SHALL BE SUBSIDIARY TO OTHER PROJECT ITEMS UNLESS SPECIFIED IN BID DOCUMENTS. NO SEPARATE PAYMENT SHALL BE APPLIED TO THESE ITEMS.
17. ALL REQUIRED FIRE LANE RESTRICTED PARKING SHALL BE APPLIED PER FIRE DEPARTMENT REQUIREMENTS.
18. CONTRACTOR IS SOLELY RESPONSIBLE FOR RAMP AND SIDEWALK CONSTRUCTION COMPLYING WITH ALL CURRENT ADA REQUIREMENTS PLUS TEXAS ACCESSIBILITY STANDARDS INCLUDING SLOPES, TEXTURE, COLOR CONTRASTS AND ELEVATIONS.
19. ACCESSIBLE PARKING SPACES AND AISLE SLOPE SHALL NOT EXCEED 2% IN ANY DIRECTION.
20. "NO PARKING" SHALL BE PAINTED IN ACCESSIBLE ISLES. LETTERS SHALL BE CAPITAL AND CENTERED IN AISLE. LETTERS SHALL BE 12" MIN CHARACTER HEIGHT AND 2" MIN. STROKE WIDTH.

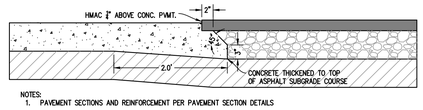


HEADER CURB DETAIL
N.T.S.



NOTES:
1. SAWCUT EXISTING SIDEWALK AS NEEDED FOR CLEAN EDGE
2. WELDED WIRE MESH REINFORCEMENT SHALL BE PLACED OVER DOWELS

NEW TO EXISTING SIDEWALK TIE-IN DETAIL
N.T.S.



NOTES:
1. PAVEMENT SECTIONS AND REINFORCEMENT PER PAVEMENT SECTION DETAILS

CONCRETE TO ASPHALT PAVEMENT INTERFACE DETAIL
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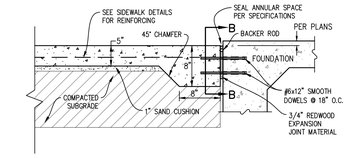
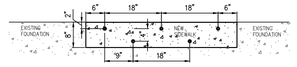


PLAN VIEW



SECTION B-B (TYPICAL DOWEL PLACEMENT)

NEW SIDEWALK TIE TO FOUNDATION DETAIL
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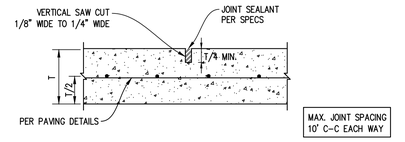

SAWED DUMMY JOINT DETAIL (CONTRACTION JOINT)
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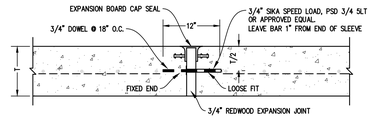

EXPANSION JOINT DETAIL
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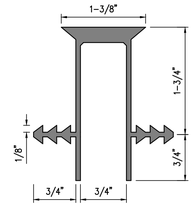

NOTES:
1. PAVING CAP SEAL SHALL BE GS 605 AS MANUFACTURED BY SIKA OR APPROVED EQUAL.
2. CAP SEAL SHALL BE SECURED TO ¾" REDWOOD EXPANSION BOARD BY STAPLING OR NAILING THROUGH BOTTOM FLANGE PRIOR TO CONCRETE PLACEMENT

PAVING CAP SEAL DETAIL
N.T.S.

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11 NOVEMBER 2025
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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
Callen Independent School District

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DATE ISSUED:
11.NOV.2025

PROJECT NUMBER:
1092-0325

SHEET NAME
PAVING DETAILS

SHEET NUMBER
C4.1

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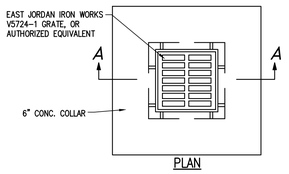

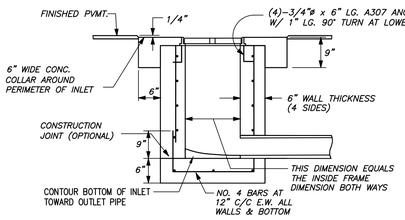

GRATE INLET DETAILS
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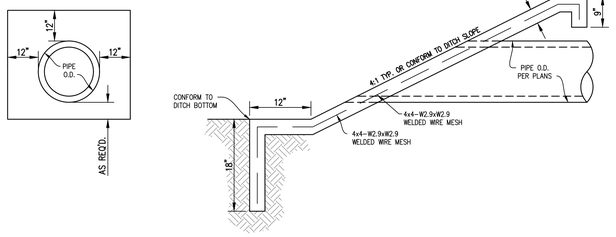
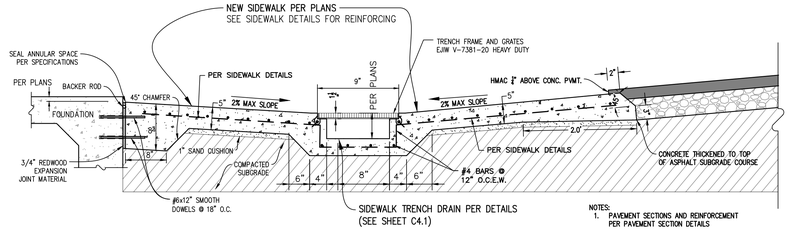


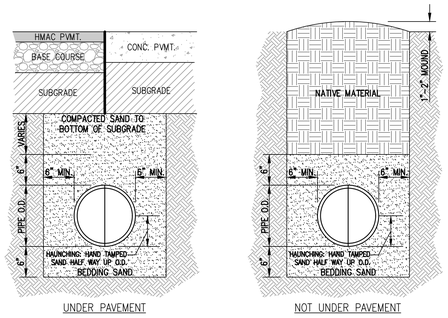
SAFETY END TREATMENT (S.E.T.) DETAILS
N.T.S.

GENERAL NOTES FOR CONCRETE DRAINAGE STRUCTURES:

1. ALL CONCRETE SHALL BE CLASS "C" (3600 PSI) EXCEPT CONCRETE COLLARS MAY BE CLASS "A".
2. ALL REINFORCING STEEL SHALL BE GRADE 60.
3. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
4. VERTICAL STEEL MAY BE SPLICED (15" MIN. LAP) IN THE LOWER ONE-HALF OF ALL INLET WALLS.
5. IN AREAS OF CONFLICT BETWEEN REINFORCING STEEL, PIPES AND MANHOLE FRAME, THE REINFORCEMENT SHALL BE BENT OR ADJUSTED TO CLEAR AS DIRECTED BY THE ENGINEER.
6. CHAMFER ALL EXPOSED EDGES 3/4".
7. ALL CONCRETE COLLARS SHALL BE 1/4" BELOW THE FINISHED PAVEMENT ELEVATION UNLESS OTHERWISE NOTED ON THE PLANS.
8. THE CONTRACTOR MAY PROPOSE ALTERNATE PROCEDURES FOR THE CONSTRUCTION OF INLETS AND MANHOLES, INCLUDING PRECAST UNITS. PLANS FOR SUCH PROPOSED ALTERNATES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL BEFORE CONSTRUCTION. PRECAST MANHOLE WITHIN THE ROADWAY SHALL BE DESIGNED TO SUPPORT HS-20 TRAFFIC LOADING AND SEALED BY A LICENSED ENGINEER.
9. ALL INLET WALLS SHALL BE FORMED EXCEPT WHERE THE NATURE OF THE SURROUNDING MATERIAL IS SUCH THAT IT CAN BE TRIMMED TO A SMOOTH VERTICAL FACE. WHEN INLET WALLS ARE PLACED TO NEAT EXCAVATION LINES THE WALL THICKNESS SHALL NOT EXCEED 10 INCHES. PAYMENT FOR INLET AT THE CONTRACT PRICE SHALL INCLUDE THE TRANSITION CURB.
10. INVERT OF INLET SHALL BE SLOPED 1:20 WITH GROUT.
11. NO SPLICING OF REINFORCING STEEL SHALL BE PERMITTED EXCEPT WHERE OTHERWISE NOTED ON THE PLANS OR PERMITTED IN WRITING BY THE ENGINEER.
12. IN DEEP EXCAVATIONS (> 20') OR BELOW WATER TABLE, USE CRUSHED STONE OR CRUSHED GRAVEL MEETING GRADATION OF CONCRETE COARSE AGGREGATE; TxDOT ITEM 421; GRADE 2, 3, OR 4.



SIDEWALK CONCRETE CHANNEL WITH TRENCH DRAIN DETAIL (SECTION B-B)
N.T.S.



SAND SPECIFICATIONS:

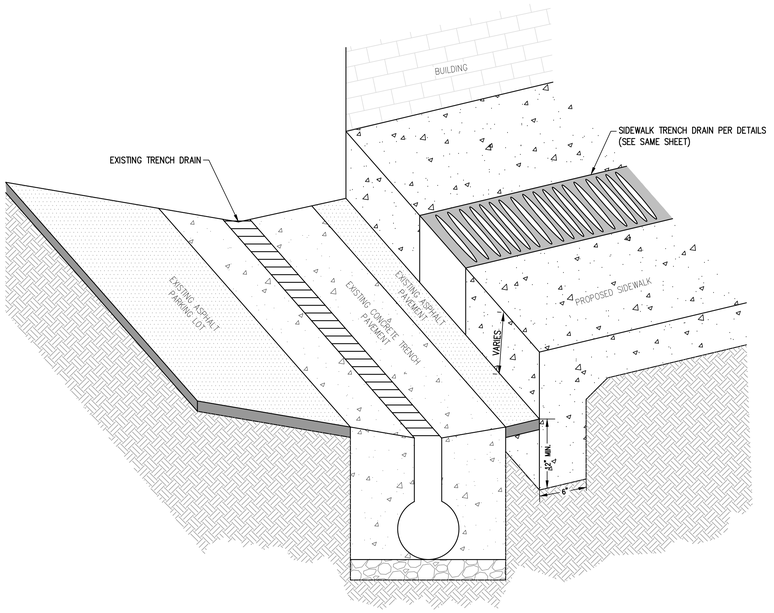
PASSING 7/8" SIEVE	100% BY WEIGHT
PASSING No. 4 SIEVE	80% BY WEIGHT
CLAY LUMPS NOT TO EXCEED	20% BY WEIGHT
PLASTICITY INDEX	NP-10 MAX

NOTES:
1. RCP SHALL HAVE JOINT FABRIC ON EXTERIOR TO PREVENT INFILTRATION OF SOIL.
2. FOR HDPE PIPE INCREASE DIMENSIONS AROUND PIPE O.D. FROM 6" TO 8".
3. ALL HDPE PIPE JOINT SYSTEM SHALL BE WATER TIGHT PIPE WITH JOINTS FACTORY TESTED TO 10 PSI OR GREATER.

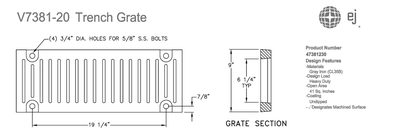
STORM PIPE BACKFILL DETAILS
N.T.S.

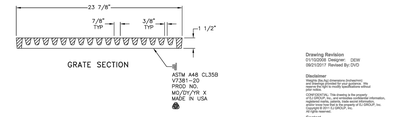
GENERAL NOTES FOR BACKFILL

TABLE 1 BEDDING AND INITIAL BACKFILL (BELOW PIPE TO 12" ABOVE PIPE)	TABLE 2 FINAL BACKFILL (GREATER THAN 12" ABOVE PIPE)	
	UNPAVED AREAS	PAVED AREAS
ALL BEDDING AND INITIAL BACKFILL SHALL CONSIST OF THE FOLLOWING: GRANULAR BACKFILL CONSISTING OF EITHER NATURAL SAND OR SAND/GRAVEL, OR MATERIAL PRODUCED BY CRUSHING OF NATURAL STONE OR GRAVEL. WATER LINES: 1. EXCAVATIONS <20FT. DEEP AND ABOVE WATER TABLE, USE MATERIAL MEETING THE FOLLOWING CRITERIA. MEETING REQUIREMENTS OF ASTM D2487 FOR: SP GP SW GW SP-SM GP-GM SW-SM GW-GM AND IN ADDITION: PASSING 1/2" SIEVE – 100% PASSING #4 SIEVE – 30% MINIMUM PLASTICITY INDEX (PI) – NP TO 10 MAX. 2. IN DEEP EXCAVATIONS (>20') OR BELOW WATER TABLE, USE CRUSHED STONE OR CRUSHED GRAVEL MEETING GRADATION OF: A. CONCRETE COARSE AGGREGATE; TxDOT ITEM 421; GRADE 2, 3, OR 4.	A. FOR 12" ABOVE PIPE TO BOTTOM OF TOPSOIL BACKFILL SHALL BE APPROVED SELECT MATERIAL FROM THE EXCAVATION; OR IMPORTED MATERIAL; ALL TO BE FREE OF ROCKS, DEBRIS, OR ANY CLUMPS GREATER THAN 2" IN DIAMETER; LOOSE LIFTS TO BE PLACED 10" MAX. COMPACT MATERIAL TO 95% STD. PROCTOR (D698). MOISTURE TO BE ADJUSTED TO ± 3% OF OPTIMUM. B. TOPSOIL TO BE PROVIDED EQUAL OR BETTER THAN EXISTING, AND MATCH EXISTING TOPSOIL DEPTH. COMPACT TO FIX CONFLICT TO EXISTING ADJACENT TOPSOIL. (CONSTRUCTION TO BE PERFORMED BY "DOUBLE DITCH" METHOD TOP SOIL SALVAGED TO BE PLACED ON TOP)	A. FOR 12" ABOVE PIPE TO 3' BELOW BOTTOM OF ROAD BASE: BACKFILL SHALL BE SELECT MATERIAL FROM EXCAVATION OR TO BE IMPORTED MATERIAL IN EITHER CASE, ALL MATERIAL SHALL MEET THE FOLLOWING: LL<35 PI 8-20 NO CLUMPS > 2" DIA. MOISTURE 0 TO +3% COMPACT 95% D698 STD PROCTOR LOOSE LIFTS OF 10" MAX OR IF SELECT MATERIAL FROM EXCAVATION DOES NOT MEET REQUIREMENTS, THEN USE CEMENT STABILIZED SAND SEE TABLE 2-ITEM B BELOW B. FOR 3' BELOW BOTTOM OF ROAD BASE TO BOTTOM OF ROAD BASE: BACKFILL SHALL BE CEMENT STABILIZED SAND (2 SK/C.Y.) AND SHALL MEET THE FOLLOWING REQUIREMENTS: SAND GRADATION: % PASSING #4 55-100 #10 40-100 #40 25-100 #200 10-20 PI NP-10 COMPACT TO 95% OF D698. MOISTURE TO BE ADJUSTED TO (+/-2%) OF OPTIMUM.

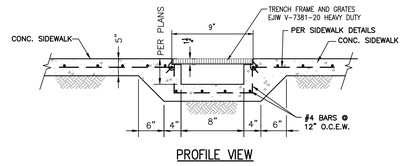


SIDEWALK CONCRETE CHANNEL WITH TRENCH DRAIN DETAIL (SECTION C-C)
N.T.S.



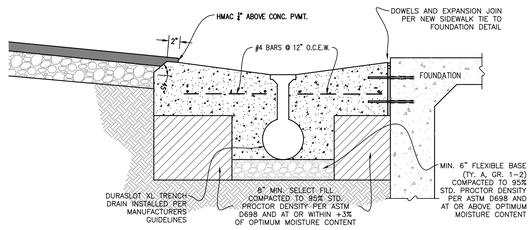


GRATE



PROFILE VIEW

SIDEWALK TRENCH DRAIN DETAIL
N.T.S.



PARKING LOT CONCRETE CHANNEL WITH TRENCH DRAIN DETAIL (SECTION A-A)
N.T.S.

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11 NOVEMBER 2025

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
Calallen Independent School District

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11.NOV.2025

PROJECT NUMBER:
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SHEET NAME
STORM WATER DETAILS

SHEET NUMBER
C4.2

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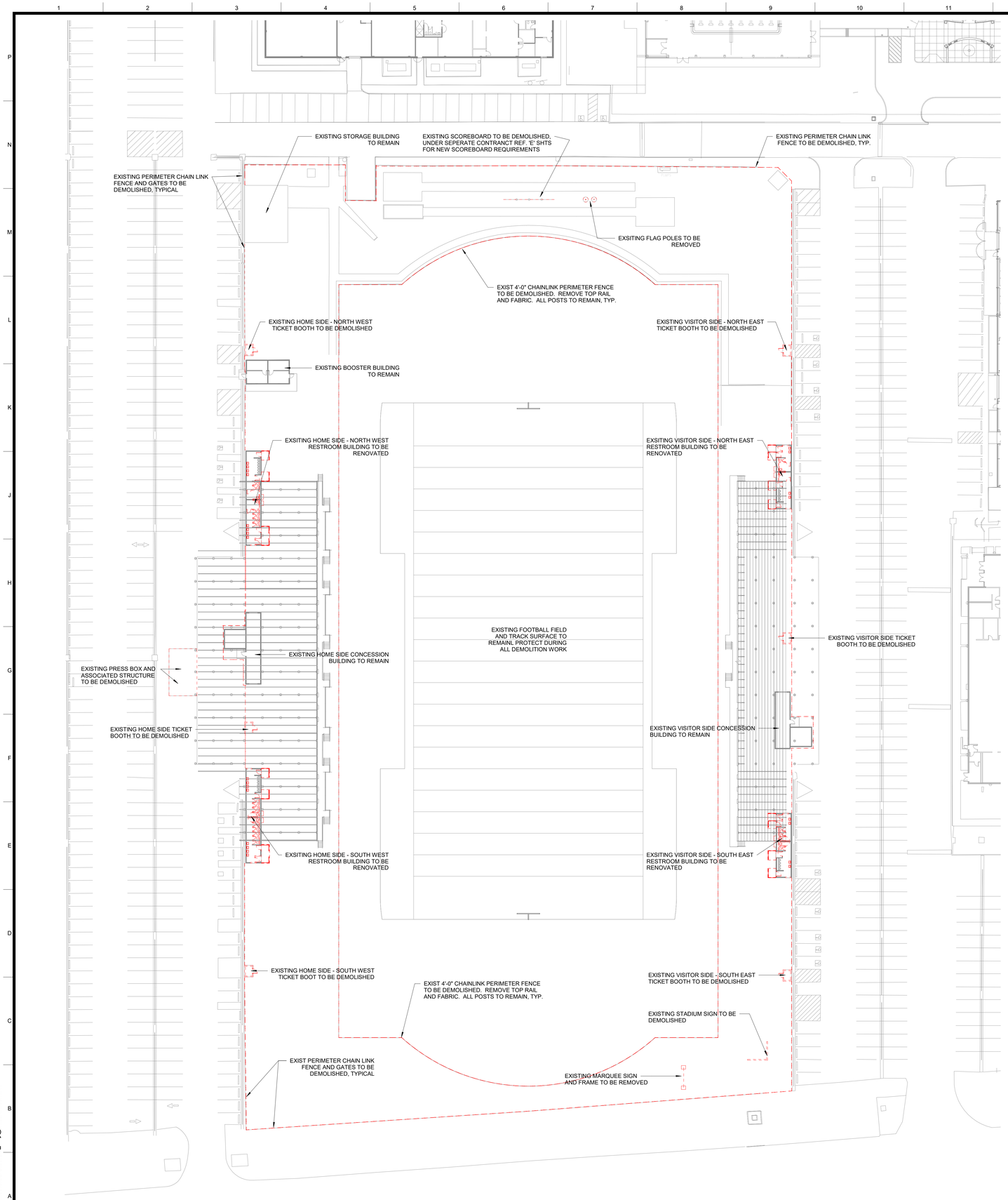
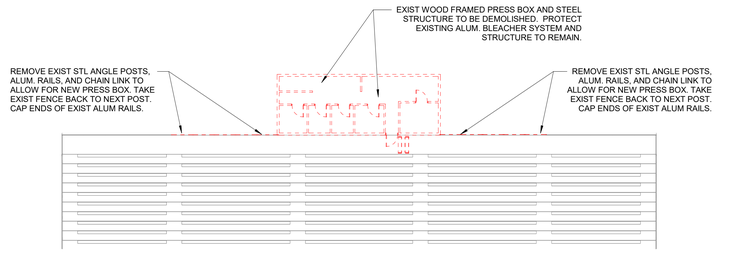


A1 STADIUM DEMOLITION PLAN
1" = 30'-0"

DEMOLITION LEGEND

- EXISTING WALLS TO REMAIN
- EXISTING DOORS TO REMAIN
- EXISTING TO BE REMOVED (REFER DEMOLITION PLANS)
- REMOVE EXISTING DOORS, FIXTURES, AND MISC IN DEMOLITION



K12 PRESS BOX DEMOLITION PLAN
1/16" = 1'-0"

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REGISTRATION NO. 19288
STATE OF TEXAS

REGISTERED ARCHITECT WILLIAM M. BERGER 19288 STATE OF TEXAS
11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

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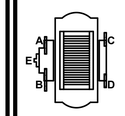
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
STADIUM DEMOLITION PLAN

SHEET NUMBER
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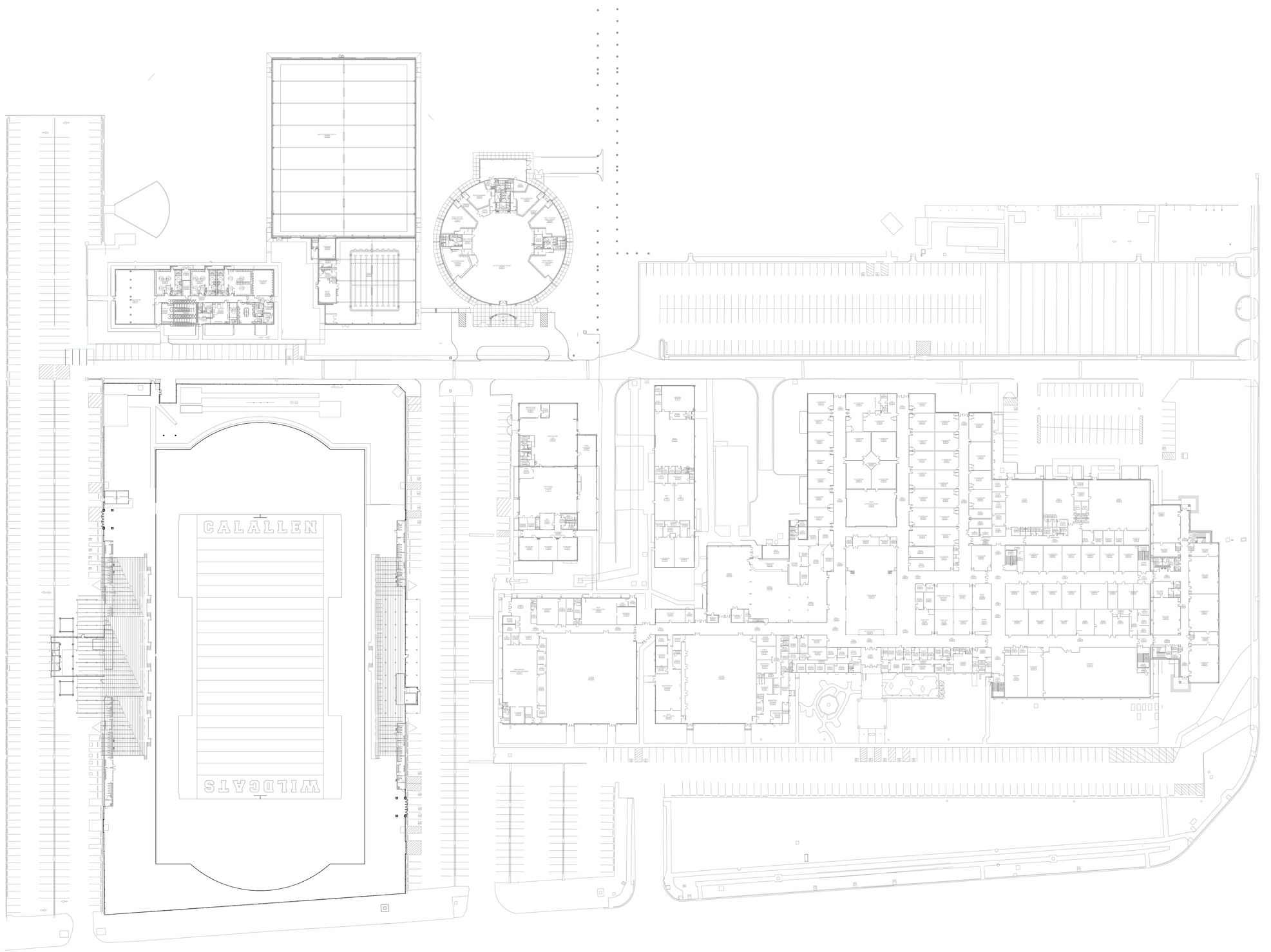

A1 HIGH SCHOOL CAMPUS PLAN
1" = 50'-0"

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

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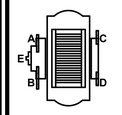

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SHEET NAME
HIGH SCHOOL CAMPUS PLAN

SHEET NUMBER
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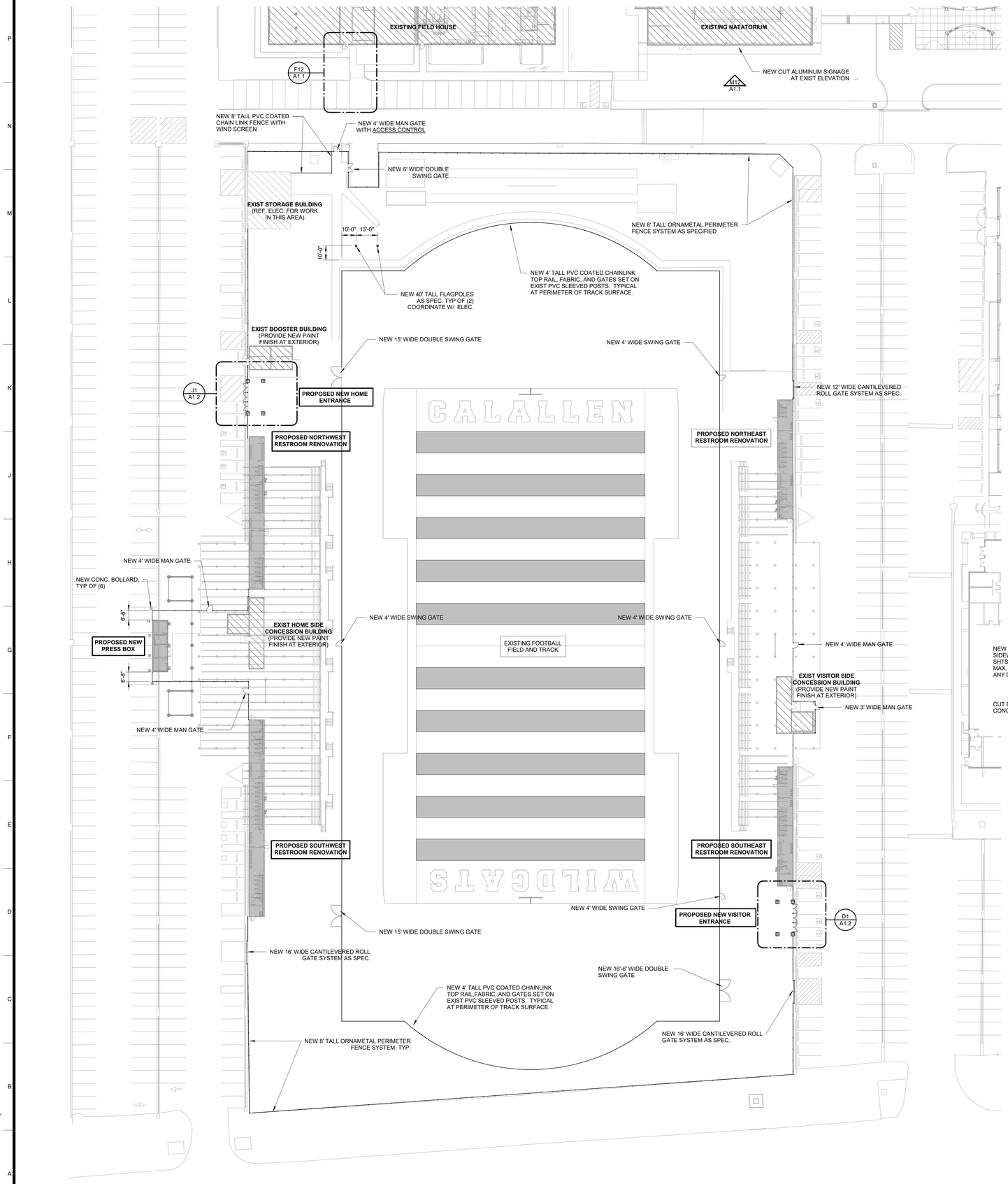
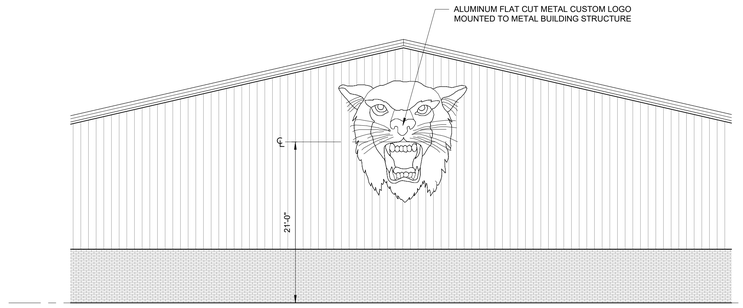
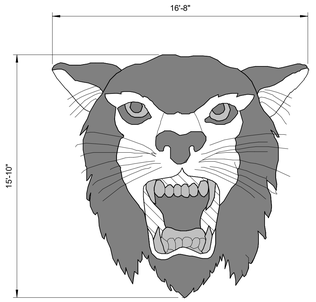


A1 STADIUM PLAN
1" = 30'-0"



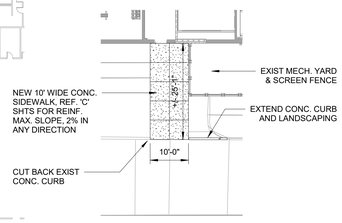
M12 PARTIAL EXISTING NATATORIUM EXTERIOR ELEVATION - SOUTH
1/8" = 1'-0"



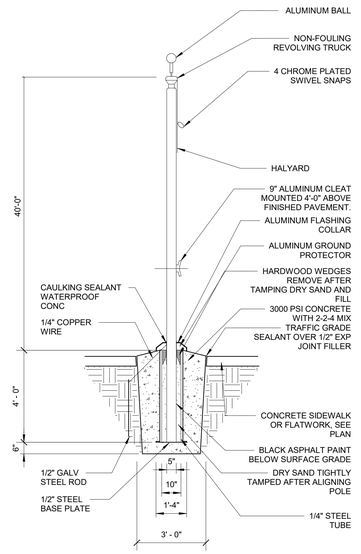
H12 WILDCAT LOGO DETAIL
1/4" = 1'-0"

GRAPHIC SIGNAGE LEGEND

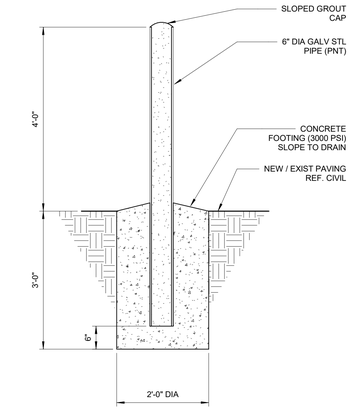
- SHERWIN WILLIAMS SW 6034 ARRESTING AUBURN
- SHERWIN WILLIAMS SW 7673 PEWTER CAST
- SHERWIN WILLIAMS SW 7653 SILVERPOINTE
- SHERWIN WILLIAMS SW 7674 PEPPERCORN



F12 ENLARGED PARTIAL SITE PLAN - FIELD HOUSE
1/16" = 1'-0"



A12 FLAG POLE DETAIL
3/8" = 1'-0"



A16 BOLLARD DETAIL
3/4" = 1'-0"

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REGISTRATION NO. 19288
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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

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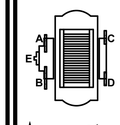

PLAN NORTH
TRUE NORTH

SHEET NAME
STADIUM PLAN

SHEET NUMBER
A1.1

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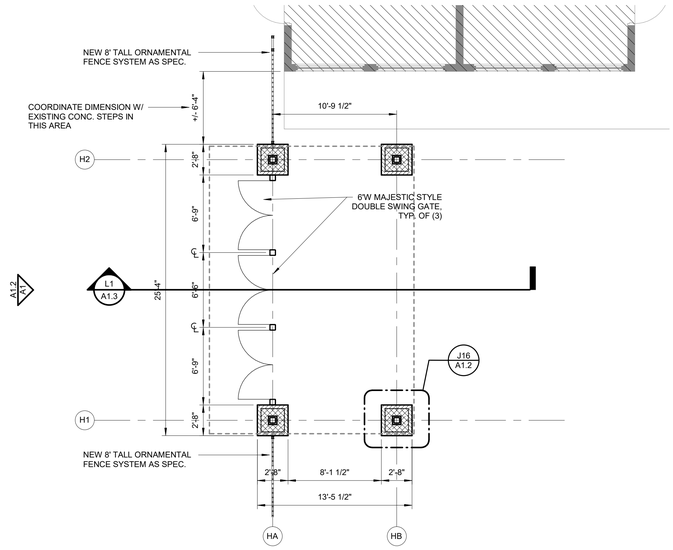
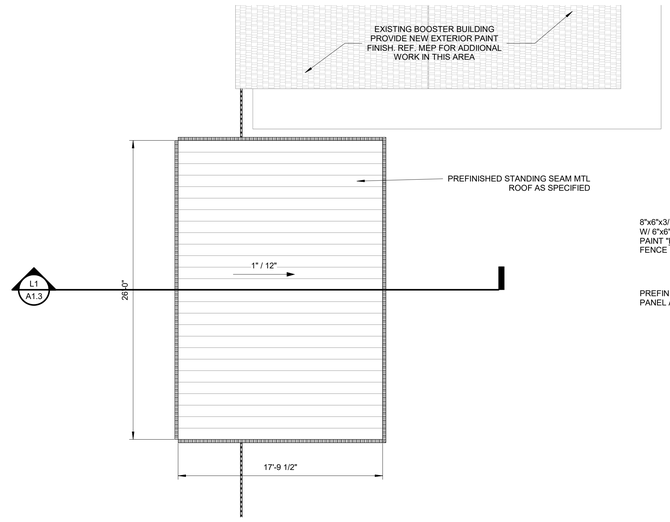
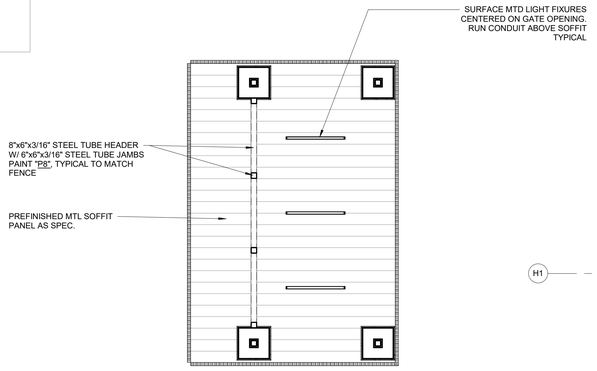


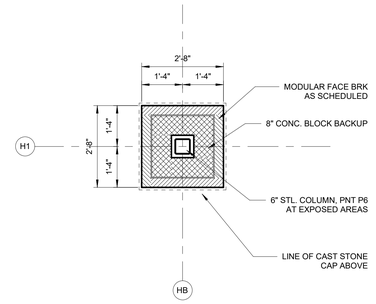
J1 NEW HOME ENTRANCE FLOOR PLAN
3/16" = 1'-0"



J7 HOME ENTRANCE ROOF PLAN
3/16" = 1'-0"



J11 HOME ENTRANCE REFLECTED CEILING PLAN
3/16" = 1'-0"



J16 TYP. MASONRY COLUMN WRAP DETAIL
1/2" = 1'-0"

D1 NEW VISITOR ENTRANCE FLOOR PLAN
3/16" = 1'-0"

D7 VISITOR ENTRANCE ROOF PLAN
3/16" = 1'-0"

D11 VISITOR ENTRANCE REFLECTED CEILING PLAN
3/16" = 1'-0"

A1 HOME ENTRANCE EXTERIOR ELEVATION
3/16" = 1'-0"

A9 VISITOR ENTRANCE EXTERIOR ELEVATION
3/16" = 1'-0"

A15 HOME/VISITOR TYP. EXTRIOR ELEVATION
3/16" = 1'-0"

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WILLIAM BERGER
REGISTERED ARCHITECT
REGISTRATION NO. 19288
STATE OF TEXAS

REGISTERED ARCHITECT WILLIAM M. BERGER 19288 STATE OF TEXAS
11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 Wildcat Dr., Corpus Christi, TX 78410

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DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)

PLAN NORTH
TRUE NORTH

SHEET NAME
STADIUM ENTRANCE PLANS

SHEET NUMBER
A1.2

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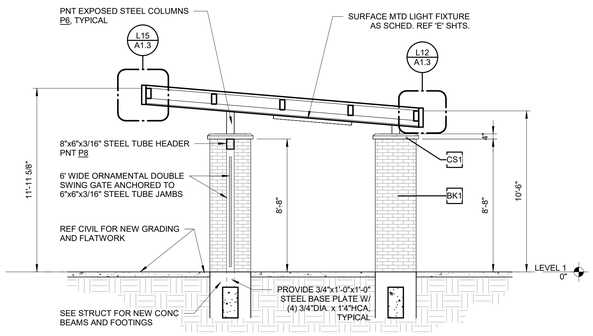
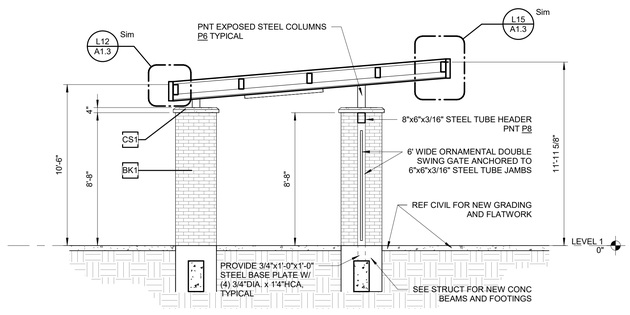
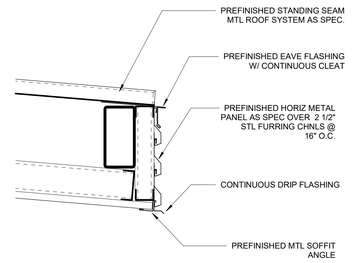


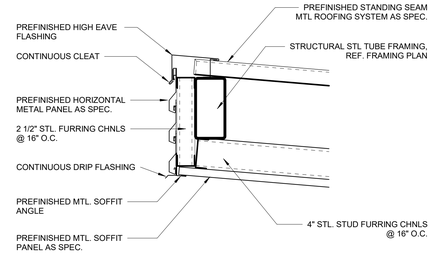
L1 HOME ENTRANCE SECTION
1/4" = 1'-0"



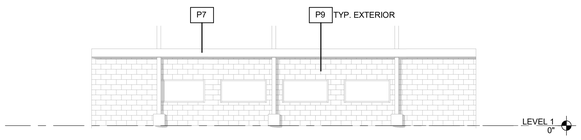
L6 VISITOR ENTRANCE SECTION
1/4" = 1'-0"



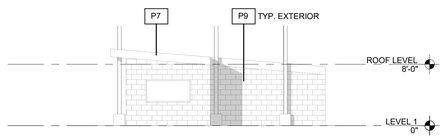
L12 LOW EAVE / FASICA DETAIL
1 1/2" = 1'-0"



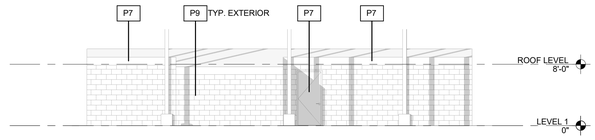
L15 HIGH EAVE / FASICA DETAIL
1 1/2" = 1'-0"



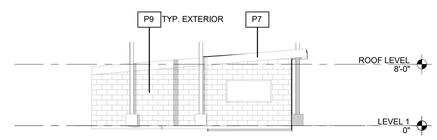
J1 EXIST HOME SIDE CONCESSION - EAST ELEVATION
1/8" = 1'-0"



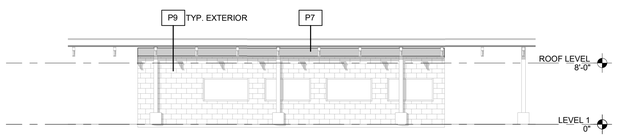
J6 EXIST HOME SIDE CONCESSION - NORTH
1/8" = 1'-0"



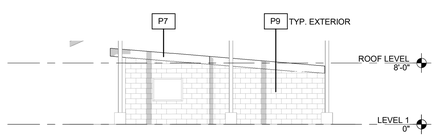
J10 EXIST HOME SIDE CONCESSION - WEST
1/8" = 1'-0"



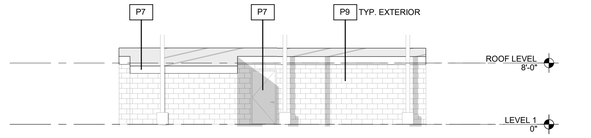
J15 EXIST HOME SIDE CONCESSION - SOUTH
1/8" = 1'-0"



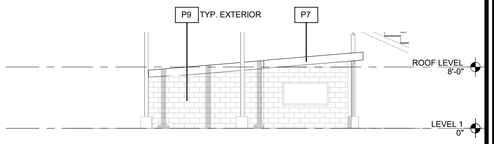
F1 EXIST VISITOR SIDE CONCESSION - WEST ELEVATION
1/8" = 1'-0"



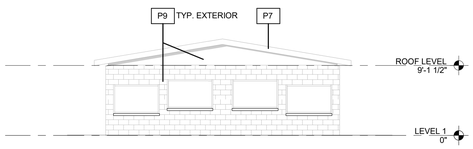
F6 EXIST VISITOR SIDE CONCESSION - SOUTH
1/8" = 1'-0"



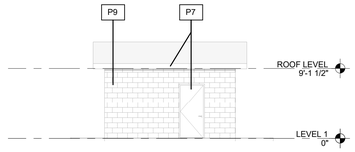
F10 EXIST VISITOR SIDE CONCESSION - EAST
1/8" = 1'-0"



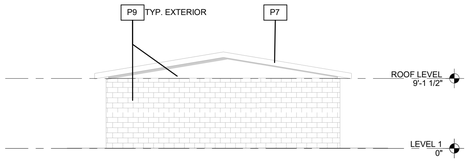
F15 EXIST VISITOR SIDE CONCESSION - NORTH
1/8" = 1'-0"



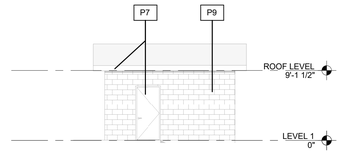
C1 EXIST BOOSTER BUILDING - SOUTH ELEVATION
1/8" = 1'-0"



C5 EXIST BOOSTER BUILDING - WEST
1/8" = 1'-0"



C9 EXIST BOOSTER BUILDING - NORTH ELEVATION
1/8" = 1'-0"



C13 EXIST BOOTER BUILDING - EAST
1/8" = 1'-0"

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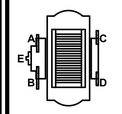

PLAN NORTH
TRUE NORTH

SHEET NAME
STADIUM ENTRANCE SECTIONS AND ELEVATIONS
SHEET NUMBER

A1.3

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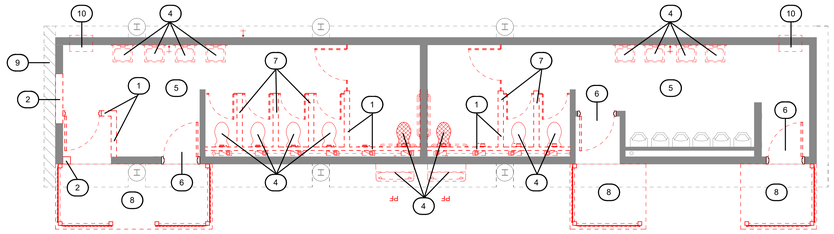
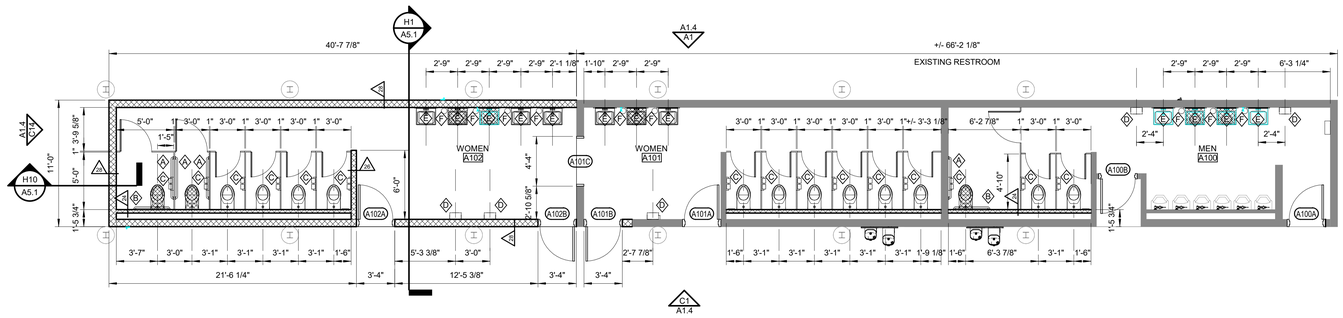
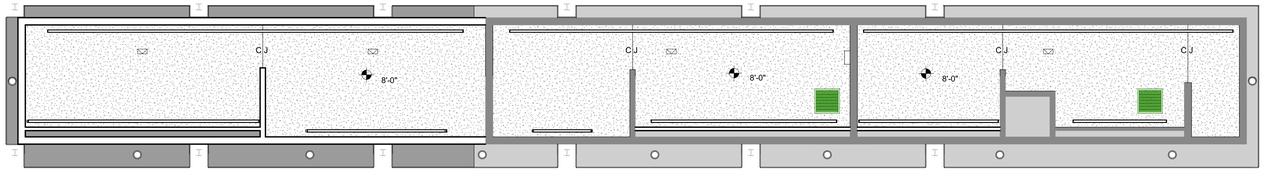


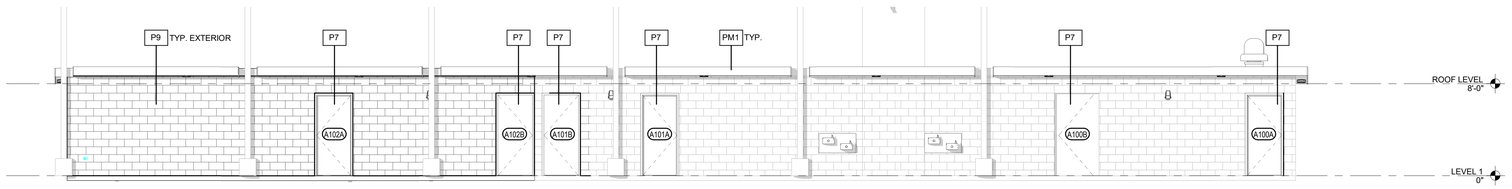
M1 DEMO PLAN - HOME SIDE - NORTHWEST RESTROOM
3/16" = 1'-0"



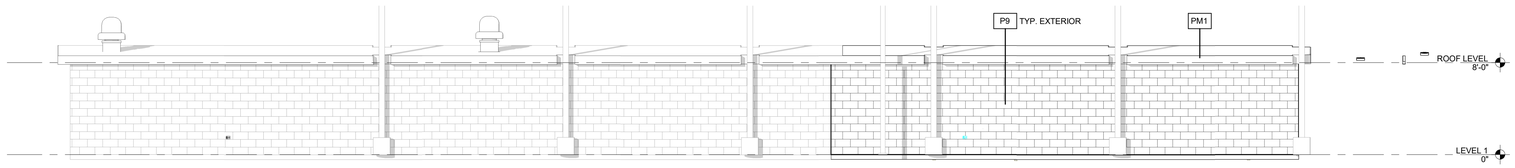
H1 FLOOR PLAN - HOME SIDE - NORTHWEST RESTROOM
3/16" = 1'-0"



F1 REFLECTED CEILING PLAN - HOME SIDE - NORTHWEST RESTROOM
3/16" = 1'-0"

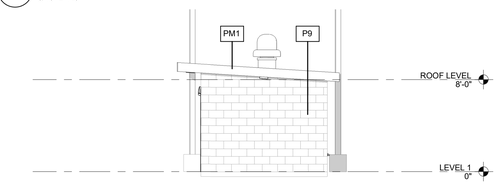


C1 EXTERIOR ELEVATION - SOUTH
3/16" = 1'-0"



A1 EXTERIOR ELEVATION - NORTH
3/16" = 1'-0"

C14 EXTERIOR ELEVATION - WEST
3/16" = 1'-0"



A14 EXTERIOR ELEVATION - EAST
3/16" = 1'-0"

DEMOLITION KEYNOTES

#	Description
1	REMOVE EXISTING WALL, AS INDICATED ON PLAN. PATCH AND REPAIR REMAINING ADJACENT SURFACES AS REQUIRED FOR NEW WALL/FLOOR FINISH AS SCHEDULED.
2	REMOVE SECTION OF EXISTING WALL AS REQUIRED FOR INSTALLATION OF NEW DOOR/FRAMED OPENING. PATCH AND REPAIR REMAINING ADJACENT SURFACES.
3	REMOVE EXISTING DOOR/WINDOW, FRAME AND ASSOCIATED HARDWARE. INFILL TO MATCH EXISTING ADJACENT WALL CONSTRUCTION AND FINISH.
4	REMOVE EXISTING PLUMBING FIXTURE. COORDINATE W/ MEP FOR REMOVAL OF EXISTING PLUMBING LINES AND EXISTING PLUMBING LINES TO REMAIN.
5	REMOVE EXISTING PLYWOOD CEILING, LIGHTING, AND CEILING MOUNTED FIXTURES THROUGHOUT. REF MEP AND REFLECTED CEILING PLAN FOR NEW CEILING AND LIGHTING LAYOUT.
6	REMOVE EXISTING DOOR AND ASSOCIATED HARDWARE. EXISTING FRAME TO REMAIN.
7	REMOVE EXISTING CMU PARTITION AS INDICATED. PATCH AND REPAIR REMAINING AJACENT SURFACES AS REQUIRED FOR NEW WALL/FLOOR FINISH AS SCHEDULED.
8	REMOVE EXISTING CONCRETE STOOP, WOODEN POSTS AND SCREEN FENCES.
9	REMOVE EXISTING ROOF OVERHANG AND SOFFIT IN THIS AREA. SEE ROOF PLAN FOR NEW ROOF AND ADDITION TIE-IN.
10	REMOVE EXISTING THROUGH-WALL EXHAUST FAN AND ASSOCIATED ELECTRICAL. INFILL EXISTING CONC. BLOCK HOLE AFTER REMOVAL. REF. MEP FOR ADDITION REQUIREMENTS.

DEMOLITION LEGEND

- EXISTING CMU WALLS TO REMAIN
- EXISTING TO BE REMOVED (REFER DEMOLITION PLANS)
- REMOVE EXISTING DOORS, FIXTURES, AND MISC IN DEMOLITION
- (1) DEMOLITION KEYNOTE

HATCH LEGEND

- REMOVE EXISTING SOFFIT AND ROOF FRAMING

GENERAL NOTES

1. ON THIS PLAN, WALL TYPE XX IS TYP AT EXTERIOR WALLS, AND WALL TYPE XX IS TYP AT INTERIOR WALLS, UON.
2. DIMENSIONS ARE TO FACE CMU, UON.

CONSTRUCTION LEGEND

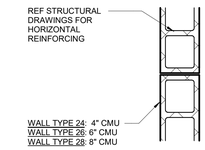
- NEW CMU WALLS (REFER TO WALL TYPES)
- EXISTING CMU WALLS TO REMAIN

RESTROOM ACCESSORY SCHEDULE

MARK	NAME	DESRIPTION & MOUNTING
A	GRAB BAR	"BOBRICK" B-6806 X 42" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
B	GRAB BAR	"BOBRICK" B-6806 X 36" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
C	TOILET TISSUE DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
D	PAPER TOWEL DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
E	MIRROR	"BOBRICK" B290 - 1836 STAINLESS STEEL ANGLE FRAME, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
F	SOAP DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR

CEILING LEGEND

- GYP BD CEILING SYSTEM OR GYP BD BULKHEAD REF DWGS. PAINT MARK "P3" U.O.N..
- NEW / EXIST PLYWOOD SOFFIT PAINT MARK "P9" U.O.N..
- 10'-0" ELEVATION HEIGHT SYMBOL INDICATES HEIGHT ABOVE FINISH FLOOR
- SURFACED MOUTED LIGHT FIXTURE REF MEP DWGS FOR LENGTHS.



EXTERIOR / INTERIOR WALL 24 26 28

H16 WALL TYPES
1" = 1'-0"

TYPICAL ROOM FINISH

GYP.P3	CEILING TYPE
P1	WALL FINISH, UNO
ERF1	BASE TYPE
ERF1	FLOOR FINISH
P1	MATERIAL TAG (REF SHEET A6.0 FOR MATERIAL SCHEDULE)

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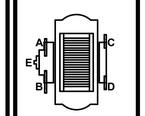

PLAN NORTH TRUE NORTH

SHEET NAME
HOME SIDE NORTHWEST RESTROOM PLANS

SHEET NUMBER
A1.4

11/10/2025 1:31:56 PM
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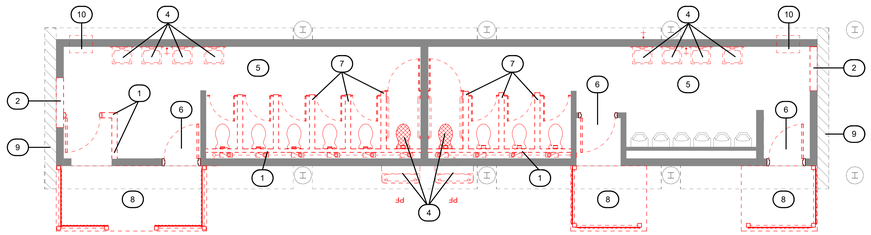

M1 DEMO PLAN - HOME SIDE - SOUTHWEST RESTROOMS
3/16" = 1'-0"

DEMOLITION KEYNOTES	
#	Description
1	REMOVE EXISTING WALL AS INDICATED ON PLAN. PATCH AND REPAIR REMAINING ADJACENT SURFACES AS REQUIRED FOR NEW WALL/FLOOR FINISH AS SCHEDULED
2	REMOVE SECTION OF EXISTING WALL AS REQUIRED FOR INSTALLATION OF NEW DOOR/FRAMED OPENING. PATCH AND REPAIR REMAINING ADJACENT SURFACES.
3	REMOVE EXISTING DOOR / FRAME AND ASSOCIATED HARDWARE. INFILL TO MATCH EXISTING ADJACENT WALL CONSTRUCTION AND FINISH.
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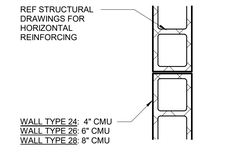
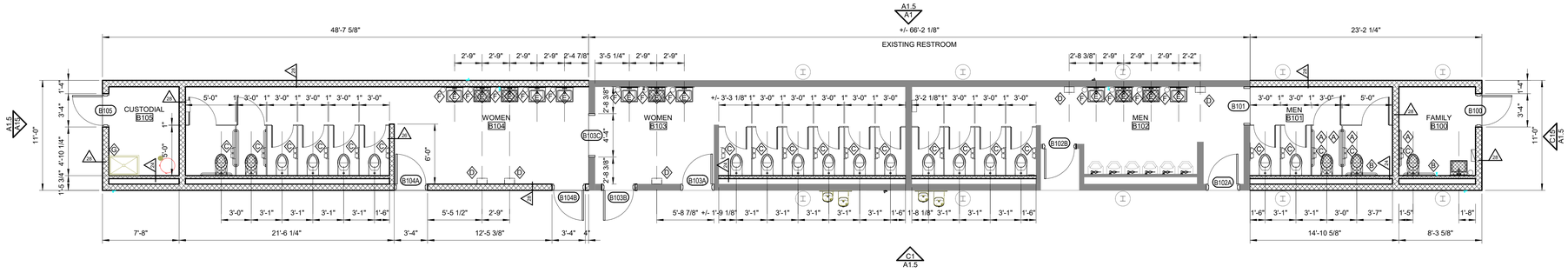
5	REMOVE EXISTING PLYWOOD CEILING, LIGHTING, AND CEILING MOUNTED FIXTURES THROUGHOUT. REF MEP AND REFLECTED CEILING PLAN FOR NEW CEILING AND LIGHTING LAYOUT.
6	REMOVE ALL EXISTING DOOR AND ASSOCIATED HARDWARE. EXISTING FRAME TO REMAIN.
7	REMOVE EXISTING CMU PARTITIONS. PATCH AND REPAIR REMAINING ADJACENT SURFACES AS REQUIRED FOR NEW WALL/FLOOR FINISH AS SCHEDULED.
8	REMOVE EXISTING CONCRETE STOOP, WOODEN POSTS AND SCREEN FENCES.
9	REMOVE EXISTING ROOF OVERHANG AND SOFFIT IN THIS AREA. SEE ROOF PLAN FOR NEW ROOF AND ADDITION TIE-IN.
10	REMOVE EXISTING THROUGH-WALL EXHAUST FAN AND ASSOCIATED ELECTRICAL. INFILL HOLE WITH CONC. BLOCK TO MATCH EXISTING. REF. MEP FOR ADDITIONAL REQUIREMNTS.

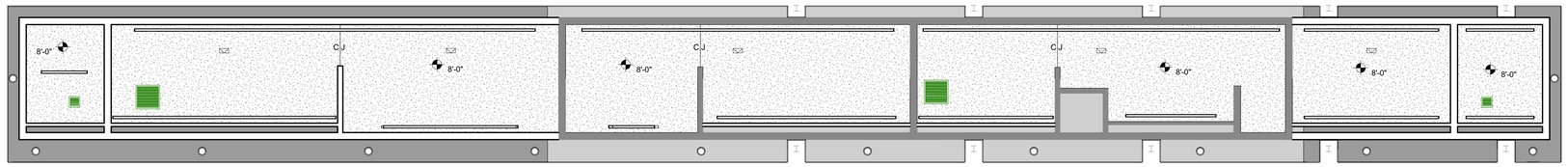


EXTERIOR / INTERIOR WALL 24 26 28

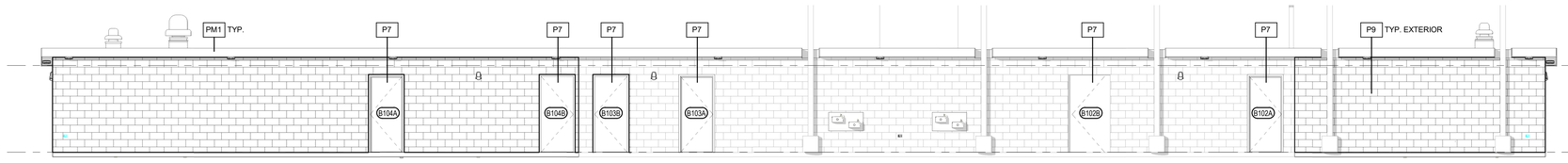
M16 WALL TYPES
1" = 1'-0"



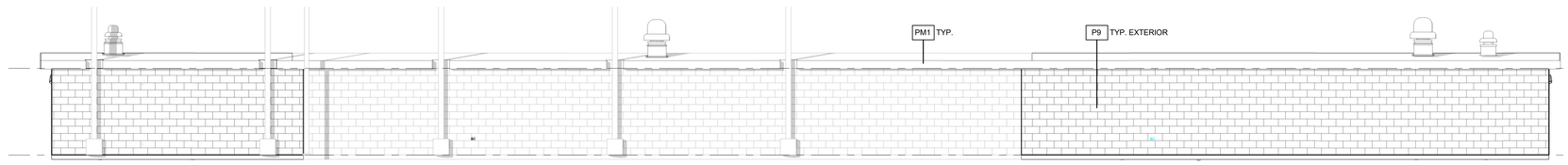
H1 FLOOR PLAN - HOME SIDE - SOUTHWEST RESTROOMS
3/16" = 1'-0"



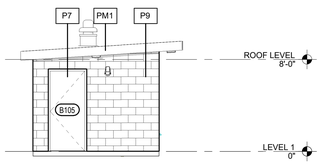
F1 REFLECTED CEILING PLAN - HOME SIDE - SOUTHWEST RESTROOMS
3/16" = 1'-0"



C1 EXTERIOR ELEVATION - SOUTH
3/16" = 1'-0"



C15 EXTERIOR ELEVATION - EAST
3/16" = 1'-0"



A1 EXTERIOR ELEVATION - NORTH
3/16" = 1'-0"

A15 EXTERIOR ELEVATION - WEST
3/16" = 1'-0"

GENERAL NOTES

1. ON THIS PLAN, WALL TYPE 28 IS TYP AT EXTERIOR WALLS, AND WALL TYPE 26 IS TYP AT INTERIOR WALLS, UON.
2. DIMENSIONS ARE TO FACE OF CMU, UON.

CONSTRUCTION LEGEND

- CMU WALLS (REFER TO WALL TYPES)
- EXISTING WALLS TO REMAIN

RESTROOM ACCESSORY SCHEDULE

MARK	NAME	DESRIPTION & MOUNTING
A	GRAB BAR	"BOBRICK" B-6806 X 42" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
B	GRAB BAR	"BOBRICK" B-6806 X 36" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
C	TOILET TISSUE DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
D	PAPER TOWEL DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
E	MIRROR	"BOBRICK" B290 - 1836 STAINLESS STEEL ANGLE FRAME, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
F	SOAP DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
G	MOP/BROOM HOLDER	"BOBRICK" B223 x 24" L STAINLESS STEEL W/3 HOLDERS, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT

CEILING LEGEND

- GYP BD CEILING SYSTEM OR GYP BD BULKHEAD REF DWGS. PAINT MARK "P3" U.O.N..
- NEW / EXISTING PLYWOOD SOFFIT. PAINT MARK "P9" U.O.N..
- 10'-0" ELEVATION HEIGHT SYMBOL INDICATES HEIGHT ABOVE FINISH FLOOR
- SURFACE MOUNTED LIGHT FIXTURE REF MEP DWGS FOR LENGTHS

TYPICAL ROOM FINISH

GYP.P3 / P1 / ERF1 / ERF1	CEILING TYPE / WALL FINISH, UNO / BASE TYPE / FLOOR FINISH
P1	MATERIAL TAG (REF SHEET A8.0 FOR MATERIAL SCHEDULE)

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WILLIAM BERGER
REGISTERED ARCHITECT
REGISTRATION NO. 19288
STATE OF TEXAS

11/11/2025

HIGH SCHOOL STADIUM IMPROVMENTS - TWO
CALALLEN INDEPENDENT SCHOOL DISTRICT
4001 Wildcat Dr, Corpus Christi, Texas 78410

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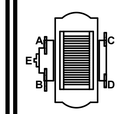
DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH / TRUE NORTH

SHEET NAME
HOME SIDE SOUTHWEST RESTROOM PLANS

SHEET NUMBER
A1.5

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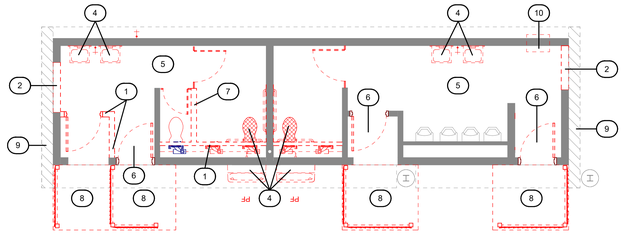
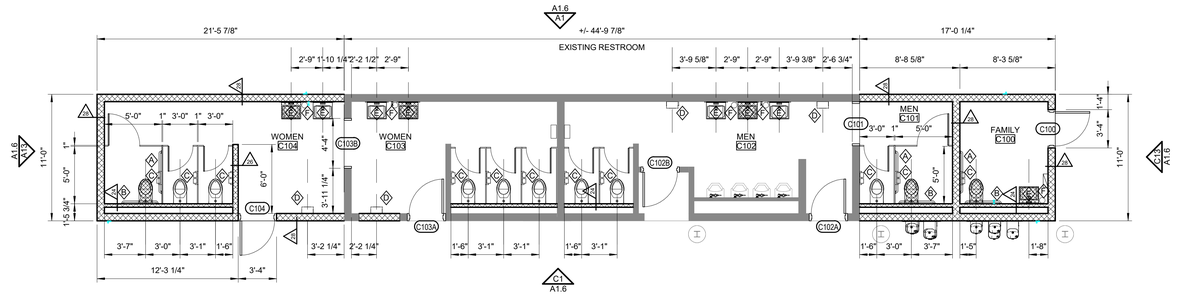
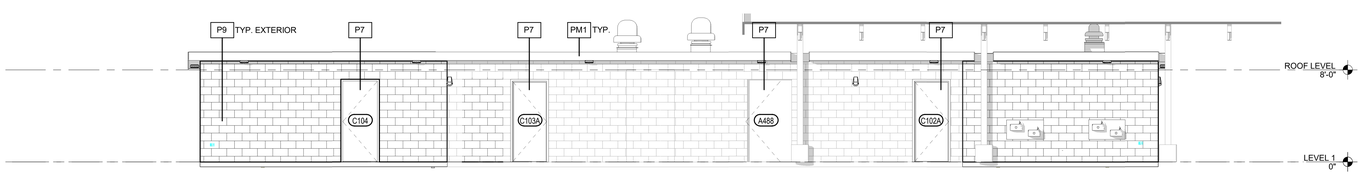


M1 DEMO PLAN - VISITOR SIDE - NORTHEAST RESTROOMS
3/16" = 1'-0"

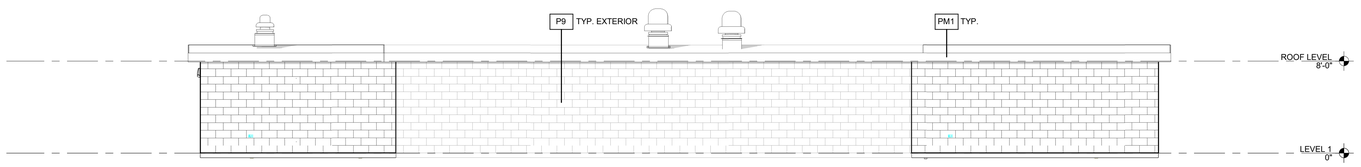


H1 FLOOR PLAN - VISITOR SIDE - NORTHEAST RESTROOMS
3/16" = 1'-0"

F1 LEVEL 1 REFLECTED CEILING PLAN
3/16" = 1'-0"

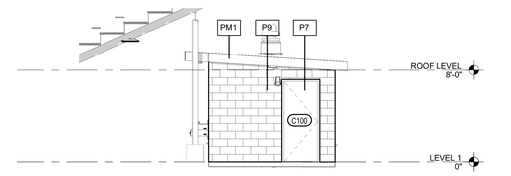


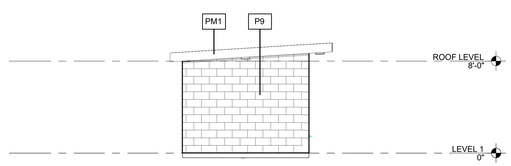
C1 EXTERIOR ELEVATION - SOUTH
3/16" = 1'-0"



A1 EXTERIOR ELEVATION - NORTH
3/16" = 1'-0"

C13 EXTERIOR ELEVATION - EAST
3/16" = 1'-0"





A13 EXTERIOR ELEVATION - WEST
3/16" = 1'-0"

DEMOLITION KEYNOTES

#	Description
1	REMOVE EXISTING WALL AS INDICATED ON PLAN. PATCH AND REPAIR REMAINING ADJACENT SURFACES AS REQUIRED FOR NEW WALL/FLOOR FINISH AS SCHEDULED.
2	REMOVE SECTION OF EXISTING WALL AS REQUIRED FOR INSTALLATION OF NEW DOOR/FRAME OR OPENING. PATCH AND REPAIR REMAINING ADJACENT SURFACES.
3	REMOVE EXISTING DOOR, FRAME AND ASSOCIATED HARDWARE. INFILL TO MATCH EXISTING ADJACENT WALL CONSTRUCTION AND FINISH.
4	REMOVE EXISTING PLUMBING FIXTURE. COORDINATE W/ MEP FOR REMOVAL OF EXISTING PLUMBING LINES AND EXISTING PLUMBING LINES TO REMAIN.
5	REMOVE EXISTING PLYWOOD CEILING, LIGHTING, AND CEILING MOUNTED FIXTURES THROUGHOUT. REF MEP AND REFLECTED CEILING PLAN FOR NEW CEILING AND LIGHTING LAYOUT.
6	REMOVE ALL EXISTING DOOR AND ASSOCIATED HARDWARE. EXISTING FRAME TO REMAIN.
7	REMOVE EXISTING CMU PARTITION AS INDICATED. PATCH AND REPAIR REMAINING ADJACENT SURFACES AS REQUIRED FOR NEW WALL/FLOOR FINISH AS SCHEDULED.
8	REMOVE EXISTING CONCRETE STOOP, WOODEN FENCE POSTS AND SCREEN FENCES.
9	REMOVE EXISTING ROOF OVERHANG AND SOFFIT IN THIS AREA. SEE ROOF PLAN FOR NEW ROOF AND ADDITION TIE-IN.
10	REMOVE EXISTING THROUGH-WALL EXHAUST FAN AND ASSOCIATED ELECTRICAL. INFILL HOLE WITH CONC. BLOCK TO MATCH EXISTING. REF. MEP FOR ADDITIONAL REQUIREMENTS.

GENERAL NOTES

1. ON THIS PLAN, WALL TYPE 28 IS TYP AT EXTERIOR WALLS, AND WALL TYPE 26 IS TYP AT INTERIOR WALLS, UON.

2. DIMENSIONS ARE TO FACE OF CMU, UON.

CONSTRUCTION LEGEND

NEW CMU WALLS (REFER TO WALL TYPES)

EXISTING CMU WALLS TO REMAIN

RESTROOM ACCESSORY SCHEDULE

MARK	NAME	DESRIPTION & MOUNTING
A	GRAB BAR	"BOBRICK" B-6806 X 42" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
B	GRAB BAR	"BOBRICK" B-6806 X 36" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
C	TOILET TISSUE DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
D	PAPER TOWEL DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
E	MIRROR	"BOBRICK" B290 - 1836 STAINLESS STEEL ANGLE FRAME, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
F	SOAP DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR

CEILING LEGEND

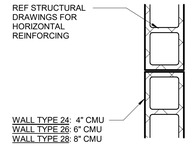
GYP BD CEILING SYSTEM OR GYP BD BULKHEAD REF DWGS. PAINT MARK "P3" U.O.N..

NEW / EXISTING PLYWOOD SOFFIT PAINT MARK "P9" U.O.N..

10'-0" ELEVATION HEIGHT SYMBOL INDICATES HEIGHT ABOVE FINISH FLOOR

SUPPLY AND RETURN AIR GRILLS. REF MEP DOCS

SURFACE MOUNTED LIGHT FIXTURE REF MEP DWGS FOR LENGTHS



EXTERIOR / INTERIOR WALL 24 26 28

H16 WALL TYPES
1" = 1'-0"

TYPICAL ROOM FINISH

GYP P3	CEILING TYPE
P1	WALL FINISH, UNO
ERF1	BASE TYPE
ERF1	FLOOR FINISH
P1	MATERIAL TAG (REF SHEET A8.0 FOR MATERIAL SCHEDULE)

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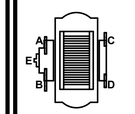
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
VISITOR SIDE NORTHEAST RESTROOM PLANS

SHEET NUMBER
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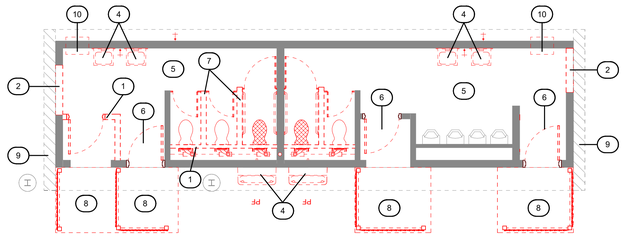
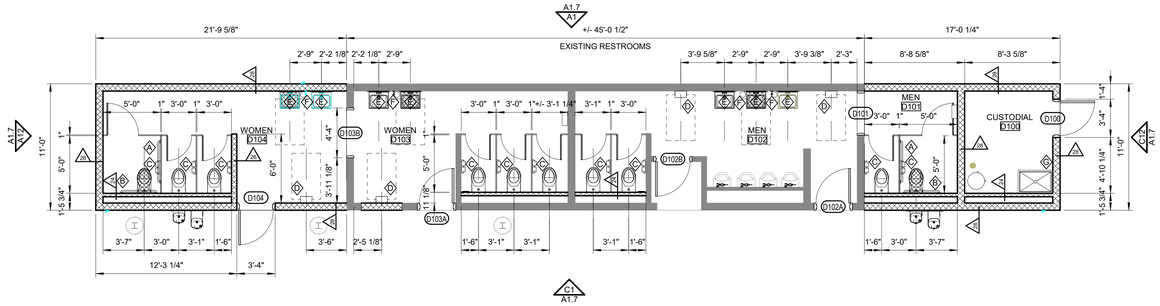
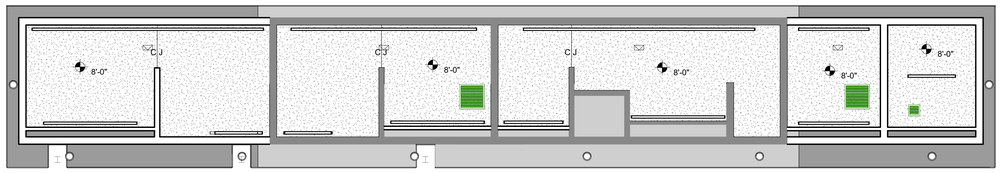


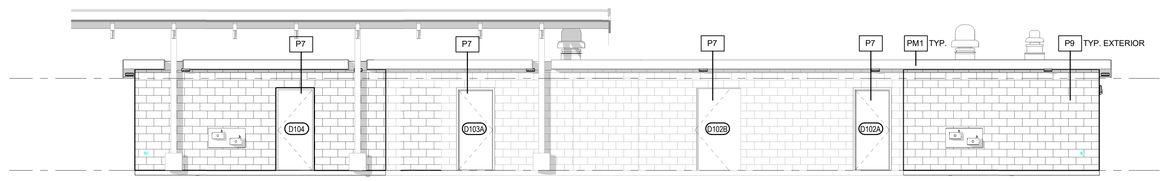
M1 DEMO PLAN - VISITOR SIDE - SOUTHEAST RESTROOMS
3/16" = 1'-0"



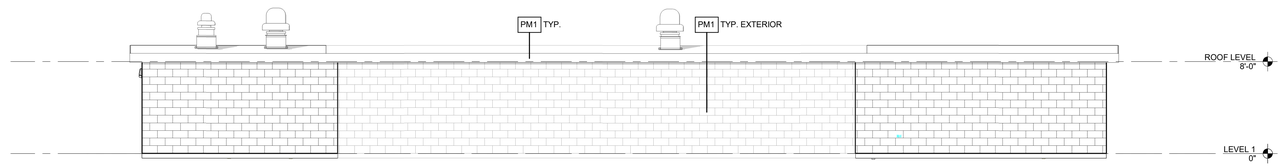
H1 FLOOR PLAN - VISITOR SIDE - SOUTHEAST RESTROOMS
3/16" = 1'-0"



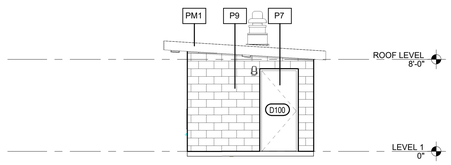
F1 REFLECTED CEILING PLAN - VISITOR SIDE - SOUTHEAST RESTROOMS
3/16" = 1'-0"



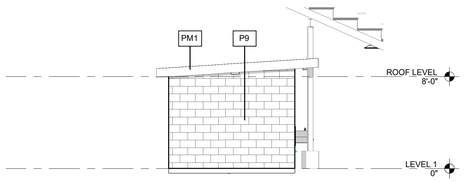
C1 EXTERIOR ELEVATION - SOUTH
3/16" = 1'-0"



A1 EXTERIOR ELEVATION - NORTH
3/16" = 1'-0"



C12 EXTERIOR ELEVATION - EAST
3/16" = 1'-0"



A12 EXTERIOR ELEVATION - WEST
3/16" = 1'-0"

DEMOLITION KEYNOTES

#	Description
1	REMOVE EXISTING WALL AS INDICATED ON PLAN. PATCH AND REPAIR REMAINING ADJACENT SURFACES AS REQUIRED FOR NEW WALL/FLOOR FINISH AS SCHEDULED.
2	REMOVE SECTION OF EXISTING WALL AS REQUIRED FOR INSTALLATION OF NEW DOOR/FRAME OR OPENING. PATCH AND REPAIR REMAINING ADJACENT SURFACES.
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5	REMOVE EXISTING PLYWOOD CEILING, LIGHTING, AND CEILING MOUNTED FIXTURES THROUGHOUT. REF MEP AND REFLECTED CEILING PLAN FOR NEW CEILING AND LIGHTING LAYOUT.
6	REMOVE EXISTING DOOR AND ASSOCIATED HARDWARE. EXISTING FRAME TO REMAIN.
7	REMOVE EXISTING CMU PARTITION AS INDICATED. PATCH AND REPAIR REMAINING ADJACENT SURFACES AS REQUIRED FOR NEW WALL/FLOOR FINISH AS SCHEDULED.
8	REMOVE EXISTING CONCRETE STOOP, WOODEN POSTS, AND SCREEN FENCES.
9	REMOVE EXISTING ROOF OVERHANG AND SOFFIT IN THIS AREA. SEE ROOF PLAN FOR NEW ROOF AND ADDITION TIE-IN.
10	REMOVE EXISTING THROUGH-WALL EXHAUST FAN AND ASSOCIATED ELECTRICAL. INFILL HOLE WITH CONC. BLOCK TO MATCH EXSITING. REF MEP FOR ADDITIONAL REQUIREMENTS.

GENERAL NOTES

1. ON THIS PLAN, WALL TYPE 28 IS TYP AT EXTERIOR WALLS, AND WALL TYPE 26 IS TYP AT INTERIOR WALLS, UON.
2. DIMENSIONS ARE TO FACE OF CMU, UON.

CONSTRUCTION LEGEND

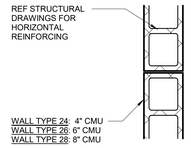
- CMU WALLS (REFER TO WALL TYPES)
- EXISTING WALLS TO REMAIN

RESTROOM ACCESSORY SCHEDULE

MARK	NAME	DESRIPTION & MOUNTING
A	GRAB BAR	"BOBRICK" B-6806 X 42" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
B	GRAB BAR	"BOBRICK" B-6806 X 36" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
C	TOILET TISSUE DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
D	PAPER TOWEL DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
E	MIRROR	"BOBRICK" B290 - 1836 STAINLESS STEEL ANGLE FRAME, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
F	SOAP DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
G	MOP/BROOM HOLDER	"BOBRICK" B223 x 24" L STAINLESS STEEL W/3 HOLDERS, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT

CEILING LEGEND

- GYP BD CEILING SYSTEM OR GYP BD BULKHEAD REF DWGS. PAINT MARK "P3" U.O.N..
- NEW / EXISTING PLYWOOD SOFFIT PAINT MARK "P9" U.O.N..
- 10'-0" ELEVATION HEIGHT SYMBOL INDICATES HEIGHT ABOVE FINISH FLOOR
- SURFACE MOUNTED LIGHT FIXTURE REF MEP DWGS FOR LENGTHS



EXTERIOR / INTERIOR WALL 24 26 28

H16 WALL TYPES
1" = 1'-0"

TYPICAL ROOM FINISH

GYP P3	CEILING TYPE
P1	WALL FINISH, UNO
ERF1	BASE TYPE
ERF1	FLOOR FINISH
P1	MATERIAL TAG (REF SHEET A8.0 FOR MATERIAL SCHEDULE)

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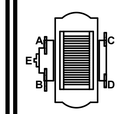

PLAN NORTH — TRUE NORTH

SHEET NAME
VISITOR SIDE SOUTHEAST RESTROOM PLANS

SHEET NUMBER
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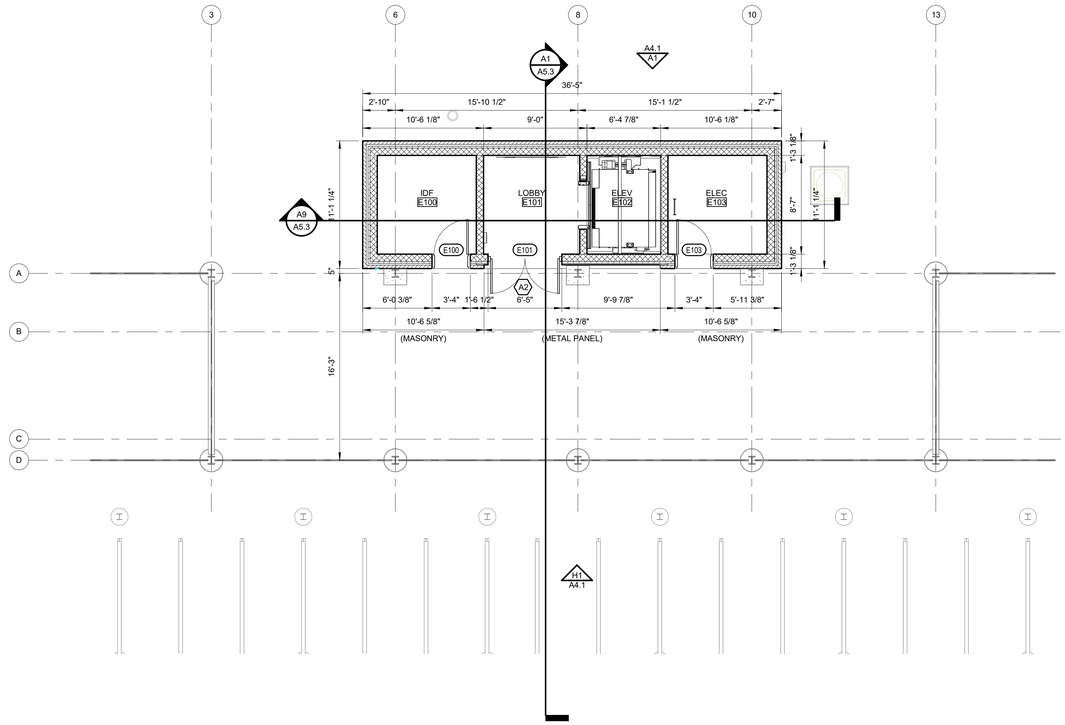
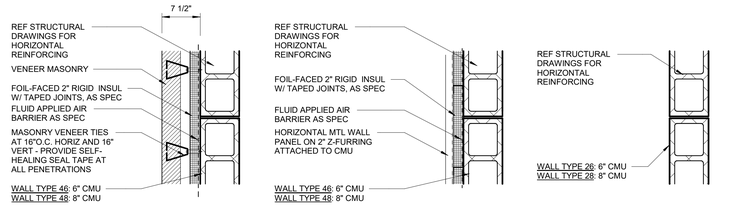
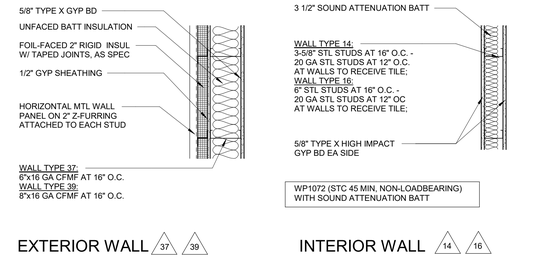
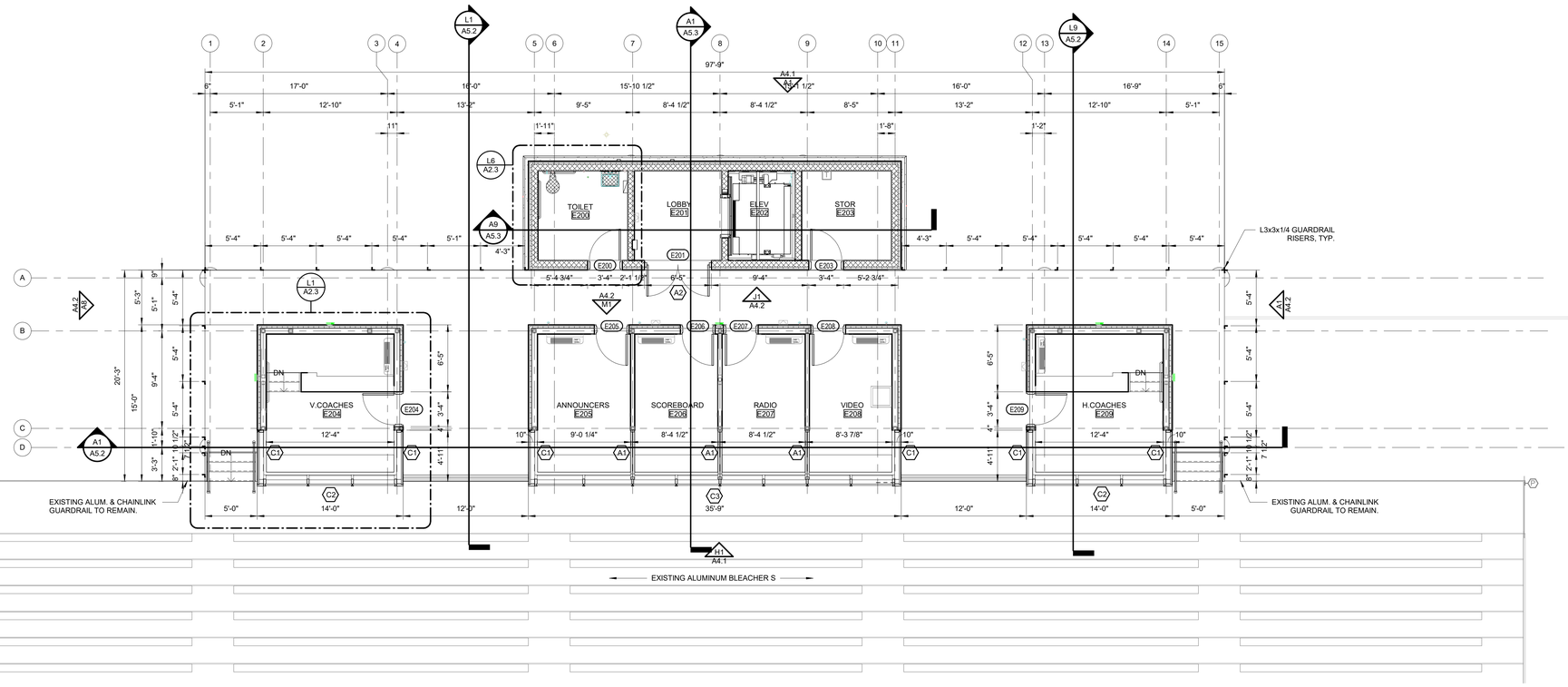


H1 LEVEL 1 PRESS BOX FLOOR PLAN
3/16" = 1'-0"





A12 WALL TYPES
1" = 1'-0"



A1 PRESS BOX LEVEL FLOOR PLAN
3/16" = 1'-0"

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REGISTRATION NO. 19288
STATE OF TEXAS

REGISTERED ARCHITECT WILLIAM BERGER 19288 STATE OF TEXAS
11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

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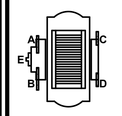

PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX FLOOR PLANS

SHEET NUMBER
A1.8

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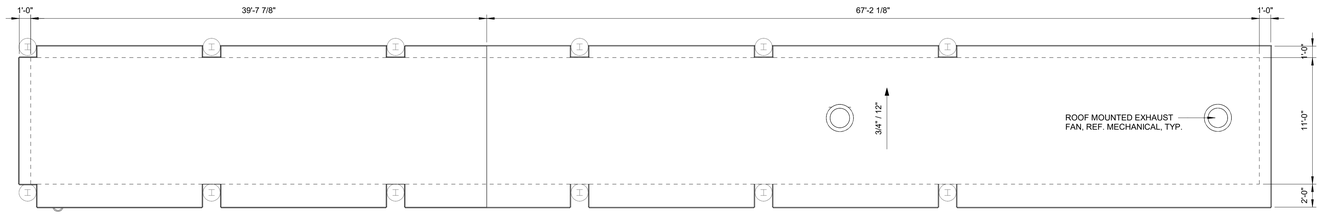
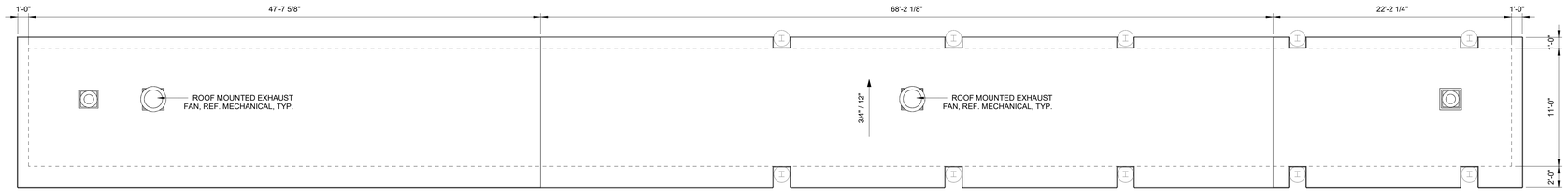
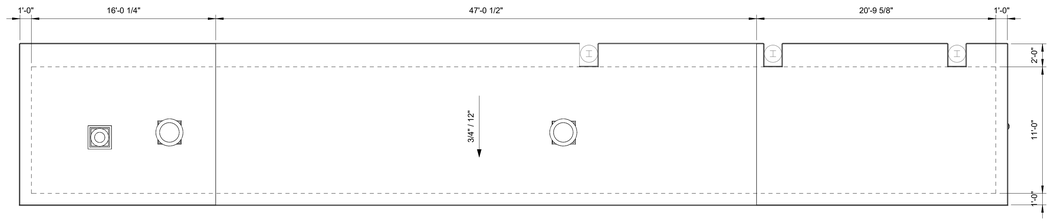


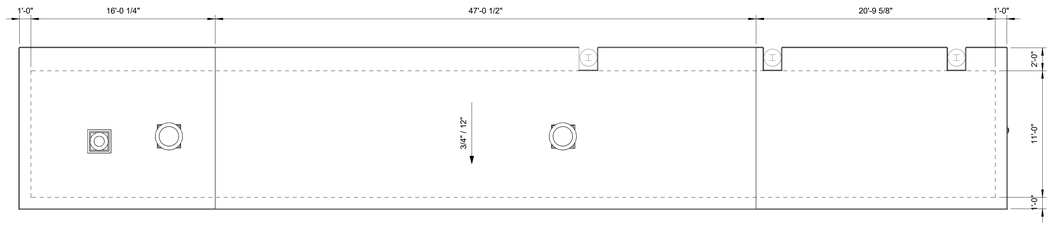
L1 ROOF PLAN - HOME SIDE - NORTHWEST RESTROOMS
3/16" = 1'-0"



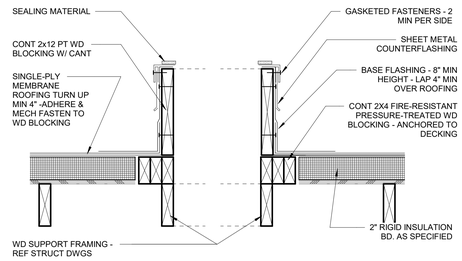
J1 ROOF PLAN - HOME SIDE - SOUTHWEST RESTROOMS
3/16" = 1'-0"



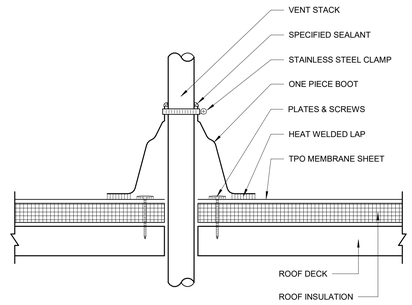
F1 ROOF PLAN - VISTOR SIDE - NORTHEAST RESTROOMS
3/16" = 1'-0"



C1 ROOF PLAN - VISTOR SIDE - SOUTHEAST RESTROOMS
3/16" = 1'-0"



C10 MEP EQUIP CURB (JOB SITE)
1 1/2" = 1'-0"



NOTES:
DO NOT CUT PREFABRICATED BOOT. IT MUST BE PULLED OVER VENT PIPE.
PREFABRICATED BOOTS ARE AVAILABLE IN SMALL & LARGE SIZES,
AND SHOULD BE USED WHENEVER POSSIBLE TO FLASH PIPES
1" TO 8" IN DIAMETER.

C15 PREFAB PLUMBING BOOT
12" = 1'-0"

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STATE OF TEXAS

11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
CALALLEN INDEPENDENT SCHOOL DISTRICT
4001 Wildcat Dr, Corpus Christi, Texas 78410

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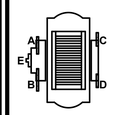
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
HOME & VISITOR SIDE - RESTROOM ROOF PLANS

SHEET NUMBER
A2.1

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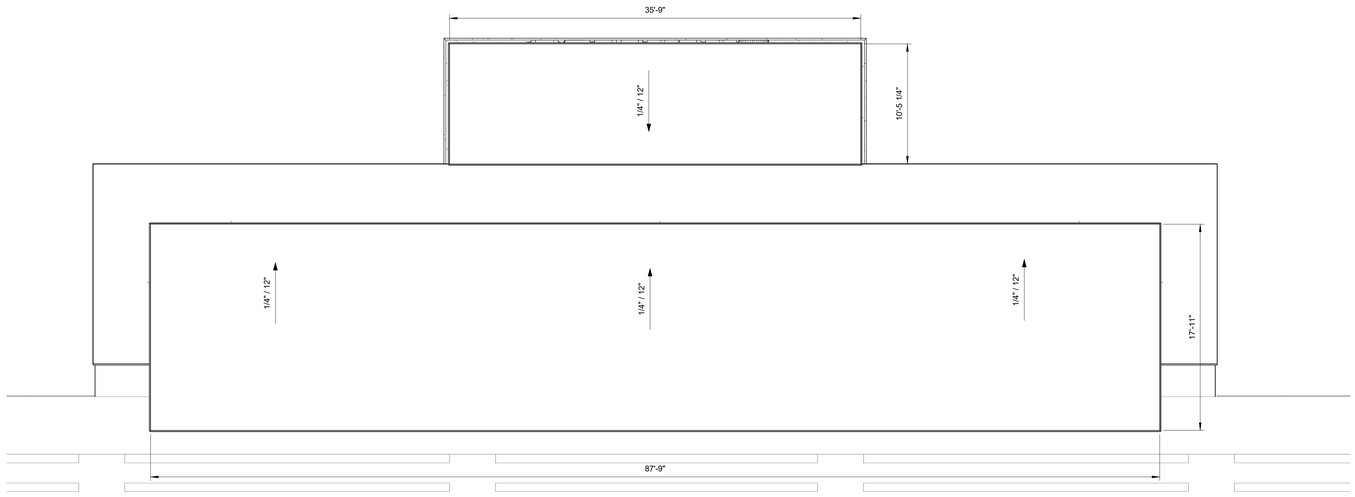

K2 PRESS BOX ROOF PLAN
3/16" = 1'-0"

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CALALLEN INDEPENDENT SCHOOL DISTRICT

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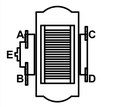

PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX ROOF PLAN

SHEET NUMBER
A2.2

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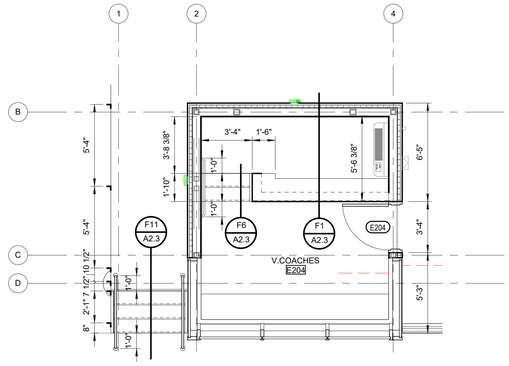
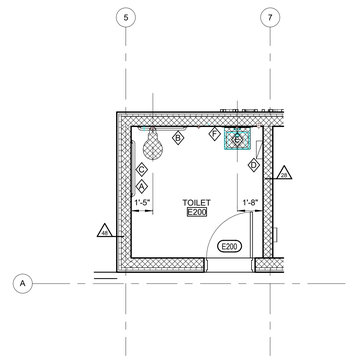


L1 ENLARGED FLOOR PLAN - COACHES PLATFORM

1/4" = 1'-0"

NOTE: OPPOSITE HAND AT H.COACHES E209

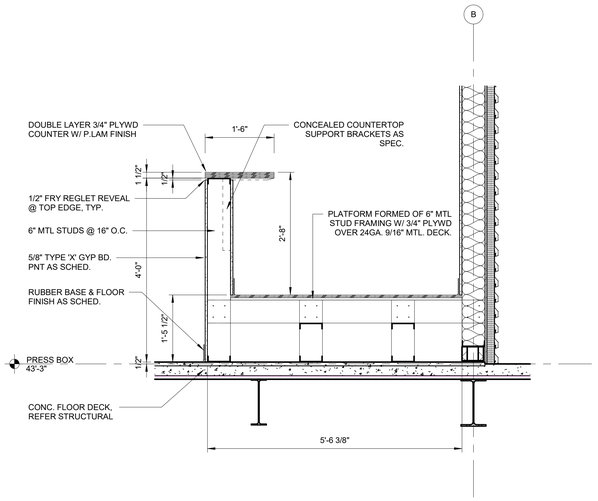


L6 ENLARGED RESTROOM PLAN

1/4" = 1'-0"

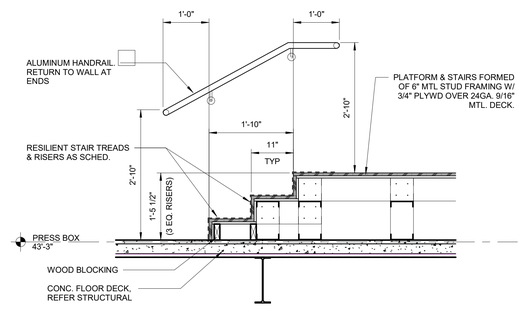
RESTROOM ACCESSORY SCHEDULE

MARK	NAME	DESRIPTION & MOUNTING
A	GRAB BAR	"BOBRICK" B-6806 X 42" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
B	GRAB BAR	"BOBRICK" B-6806 X 36" 1 1/2" DIAMETER, STAINLESS STEEL - SATIN FINISH, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
C	TOILET TISSUE DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
D	PAPER TOWEL DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR
E	MIRROR	"BOBRICK" B290 - 1836 STAINLESS STEEL ANGLE FRAME, REFER TO SHEET G1.2 FOR MOUNTING HEIGHT
F	SOAP DISPENSER	FURNISHED BY OWNER, INSTALLED BY CONTRACTOR



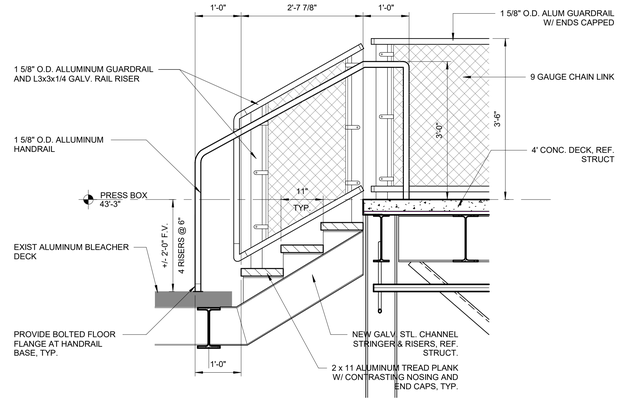
F1 PLATFORM SECTION

3/4" = 1'-0"



F6 PLATFORM SECTION

3/4" = 1'-0"



F11 EXTERIOR STAIR DETAIL

3/4" = 1'-0"

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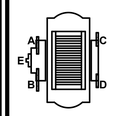

PLAN NORTH
TRUE NORTH

SHEET NAME
ENLARGED PRESS BOX PLANS, PLAN DETAILS

SHEET NUMBER
A2.3

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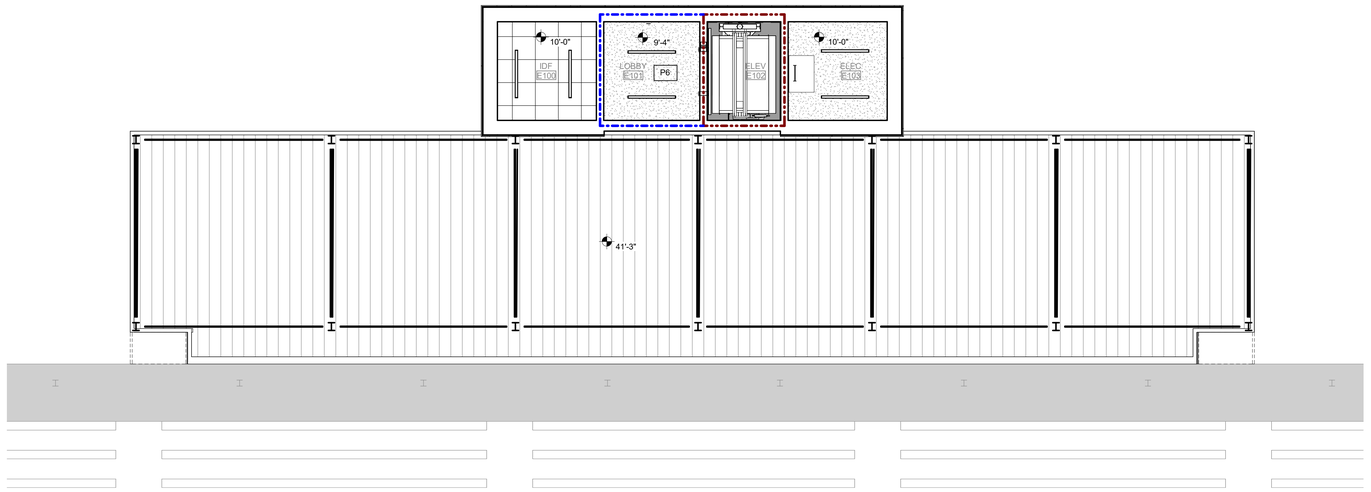
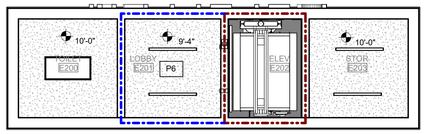
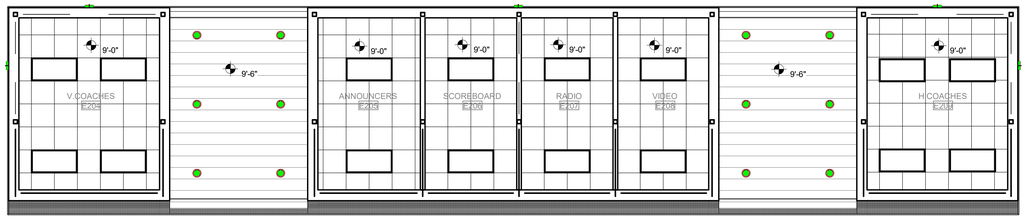


J1 LEVEL 1 - PRESS BOX REFLECTED CEILING PLAN
3/16" = 1'-0"





A1 PRESS BOX LEVEL REFLECTED CEILING PLAN
3/16" = 1'-0"

CEILING LEGEND

- ACOUSTICAL PANEL CEILING SYSTEM. REF MATERIAL SCHEDULE FOR TYPES.
- SUSPENDED GYP BD CEILING SYSTEM OR GYP BD BULKHEAD REF DWGS. PAINT MARK "P1" U.O.N.
- PREFINISHED METAL SOFFIT PANEL AS SCHED. ON MTL STUD FRAMING
- 10'-0" ELEVATION HEIGHT SYMBOL INDICATES HEIGHT ABOVE FINISH FLOOR
- SUPPLY AND RETURN AIR GRILLS. REF MEP DOCS
- RECESSED 2' X 4' LIGHT FIXTURE REF MEP DWGS
- SURFACE MTD FIXTURE REF MEP DWGS.
- SURFACE MTD FIXTURE REF MEP DWGS.
- WALL MOUNTED LIGHT REFER TO MEP DWGS

WALL TO DECK LEGEND

- WALL TO DECK
- 1 HR RATED WALL
- 2 HR RATED WALL

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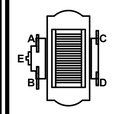

PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX REFLECTED CEILING PLANS

SHEET NUMBER
A3.1

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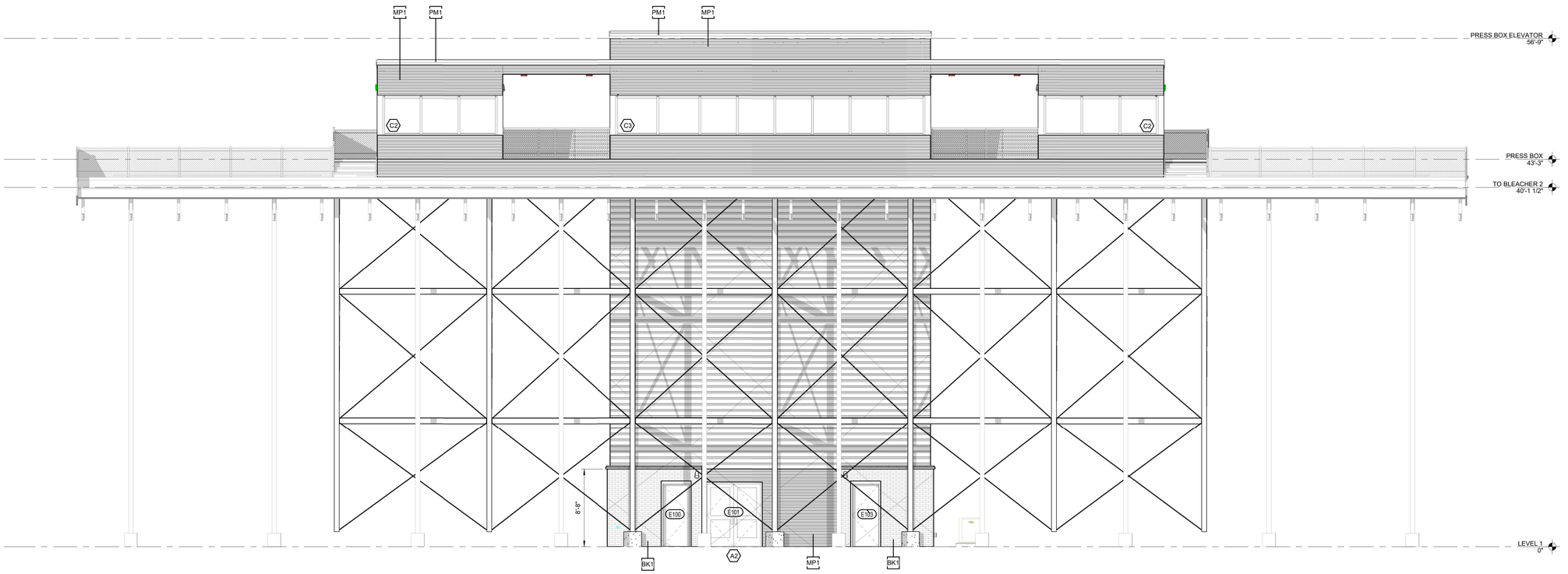
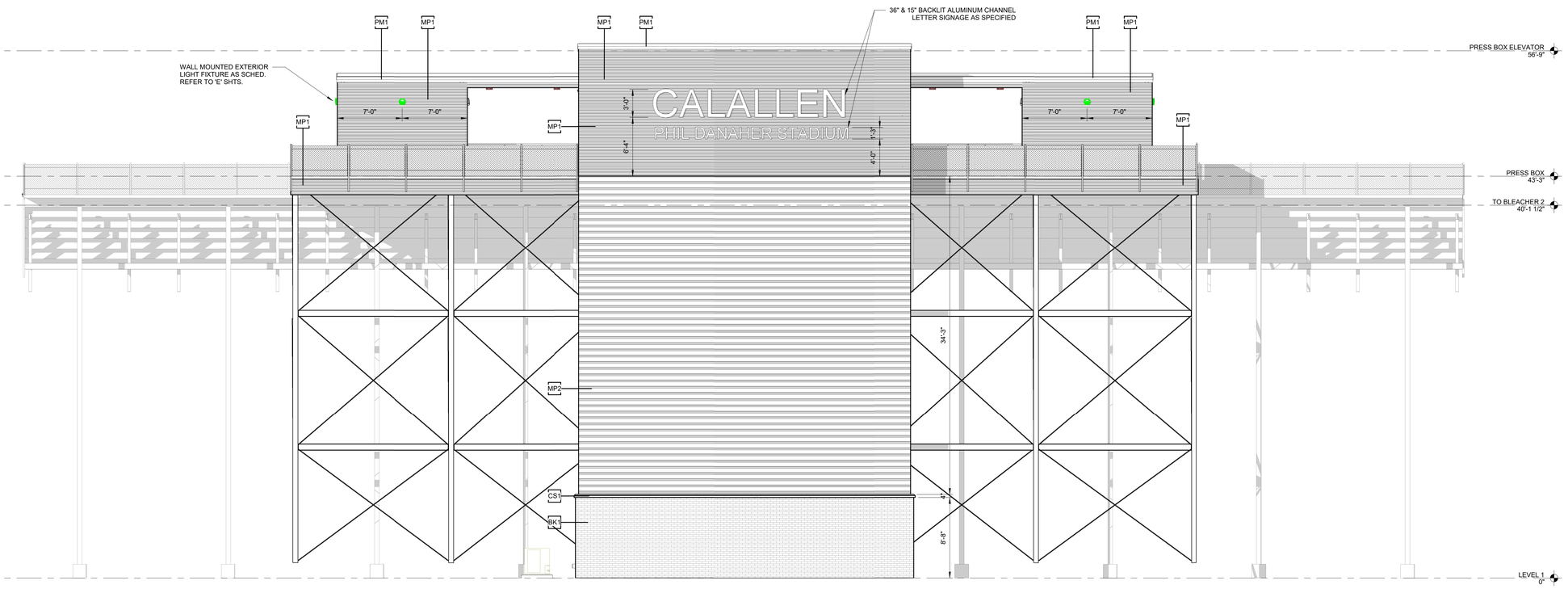


H1 EXTERIOR ELEVATION - PRESS BOX EAST
3/16" = 1'-0"



A1 EXTERIOR ELEVATION - PRESS BOX WEST
3/16" = 1'-0"

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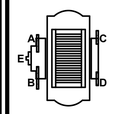
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX EXTERIOR ELEVATIONS

SHEET NUMBER
A4.1

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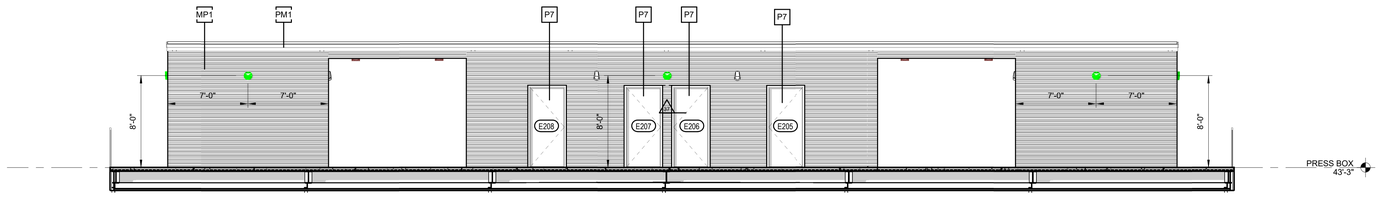
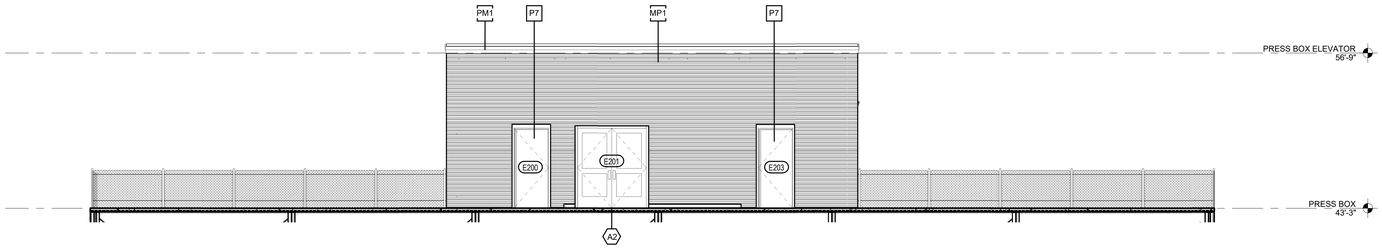
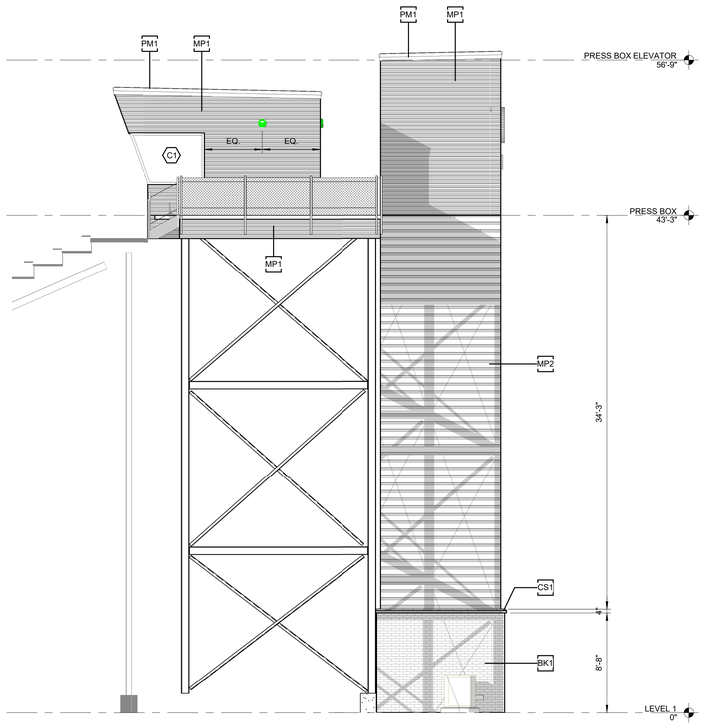


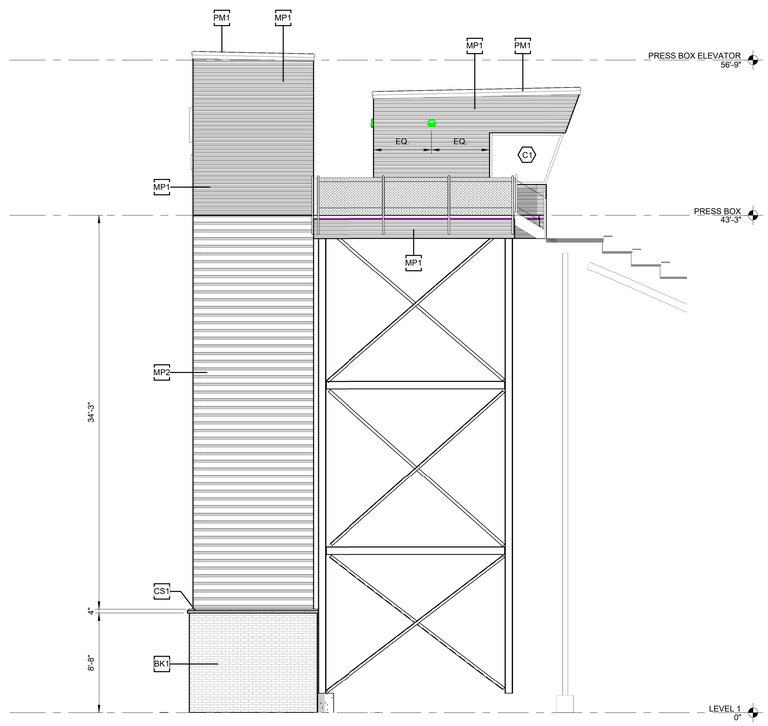
M1 EXTERIOR ELEVATION - PRESS BOX LEVEL EAST
3/16" = 1'-0"



J1 EXTERIOR ELEVTION - PRESS BOX ELEVATOR TOWER EAST
3/16" = 1'-0"



A1 EXTERIOR ELEVATION - PRESS BOX SOUTH
3/16" = 1'-0"



A8 EXTERIOR ELEVATION - PRESS BOX NORTH
3/16" = 1'-0"

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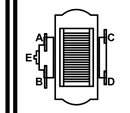
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX EXTERIOR ELEVATIONS

SHEET NUMBER
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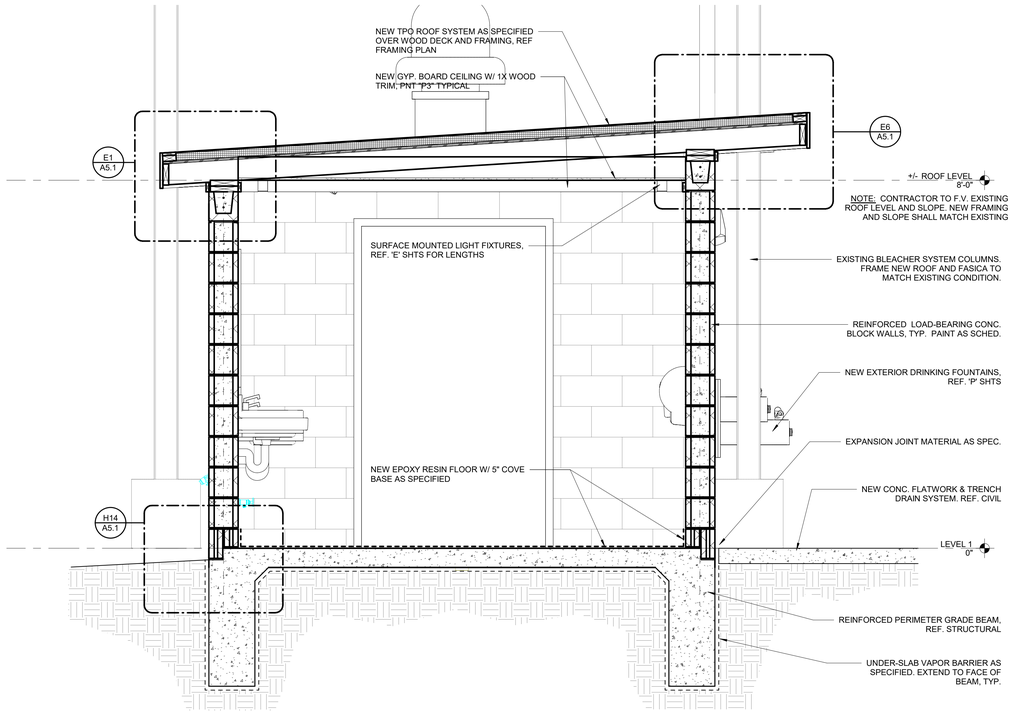
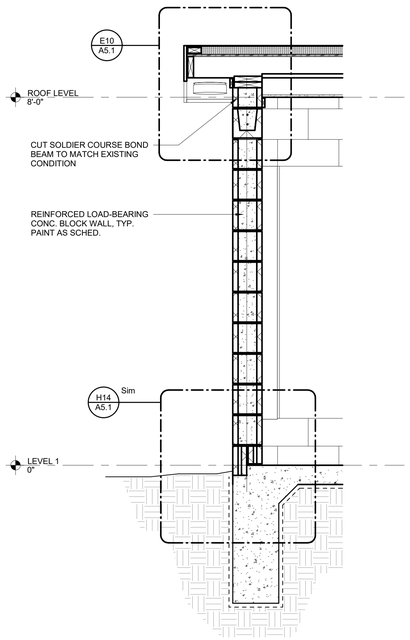
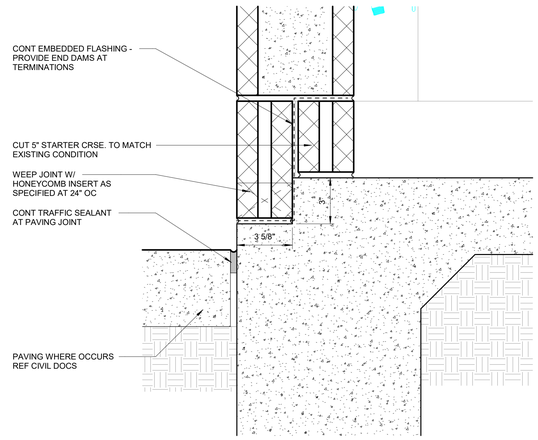


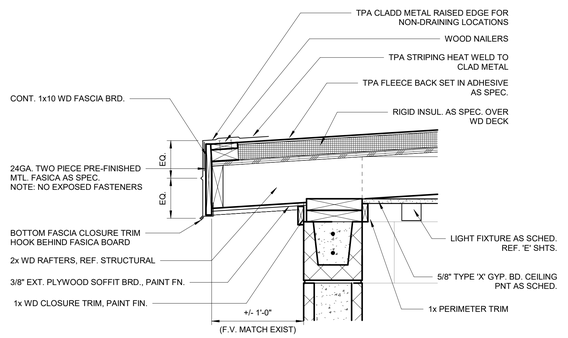
H1 TYPICAL HOME SIDE / VISITOR SIDE RESTROOM SECTION
3/4" = 1'-0"



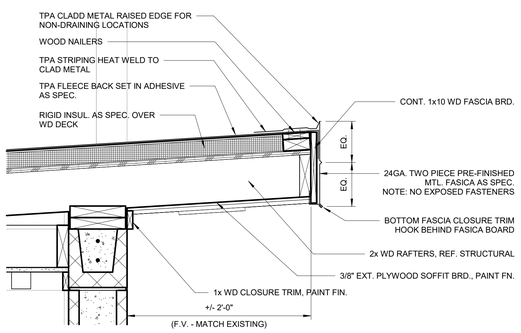
H10 TYPICAL END WALL SECTION
3/4" = 1'-0"



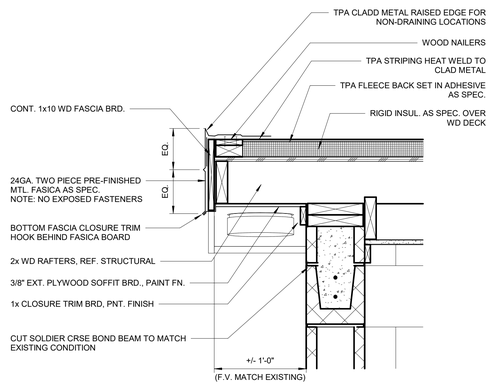
H14 TYPICAL MASONRY LEDGE DETAIL
3" = 1'-0"



E1 TYPICAL LOW EAVE DETAIL
1 1/2" = 1'-0"



E6 TYPICAL HIGH EAVE DETAIL
1 1/2" = 1'-0"



E10 TYPICAL RAKE DETAIL
1 1/2" = 1'-0"

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REGISTRATION NO. 19288
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CALALLEN INDEPENDENT SCHOOL DISTRICT

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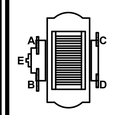
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
HOME SIDE & VISITOR SIDE RESTROOM BUILDING SECTIONS
SHEET NUMBER

A5.1

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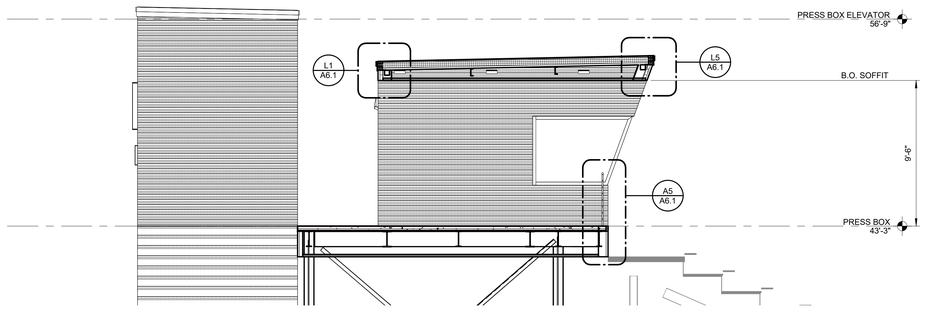
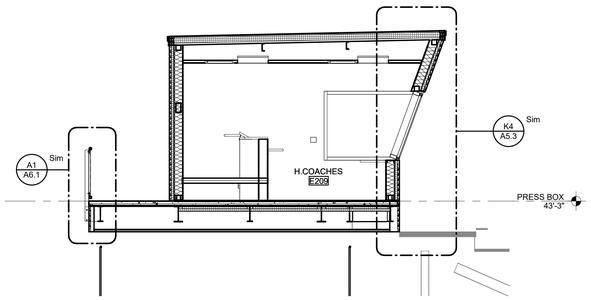
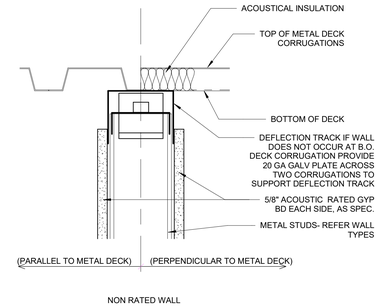


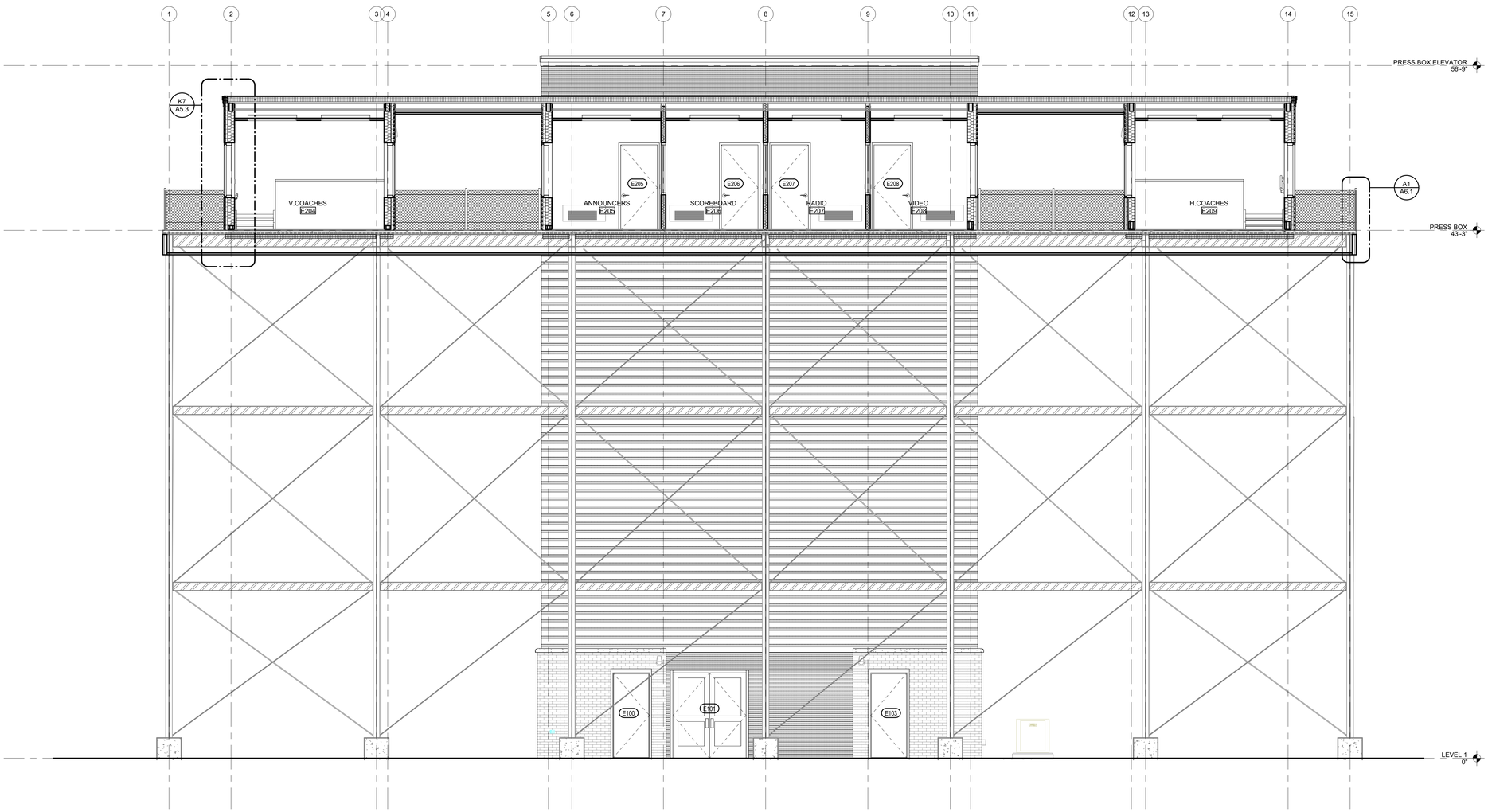
L1 BUILDING SECTION - FILMING DECK
1/4" = 1'-0"



L9 BUILDING SECTION - PRESS BOX
1/4" = 1'-0"



I15 METAL STUD WALL TO DECK DETAIL
3" = 1'-0"



A1 BUILDING SECTION - PRESS BOX
1/4" = 1'-0"

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REGISTERED ARCHITECT
REGISTRATION NO. 19288
STATE OF TEXAS

11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 Wildcat Dr, Corpus Christi, Texas 78410

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DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)

PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX BUILDING SECTIONS

SHEET NUMBER
A5.2

11/10/2025 1:23:01 PM
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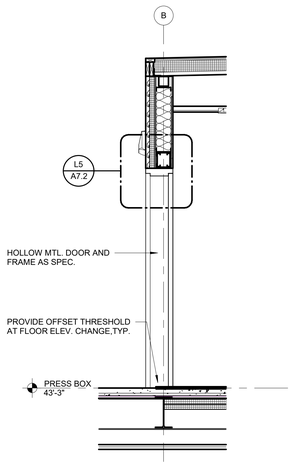
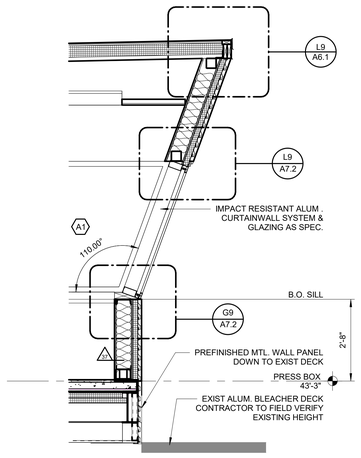
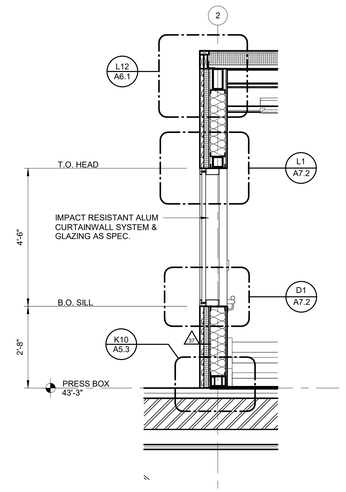


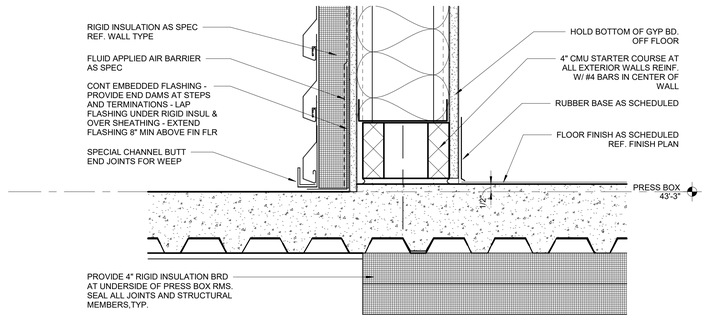
K1 WALL SECTION - PRESS BOX
1/2" = 1'-0"



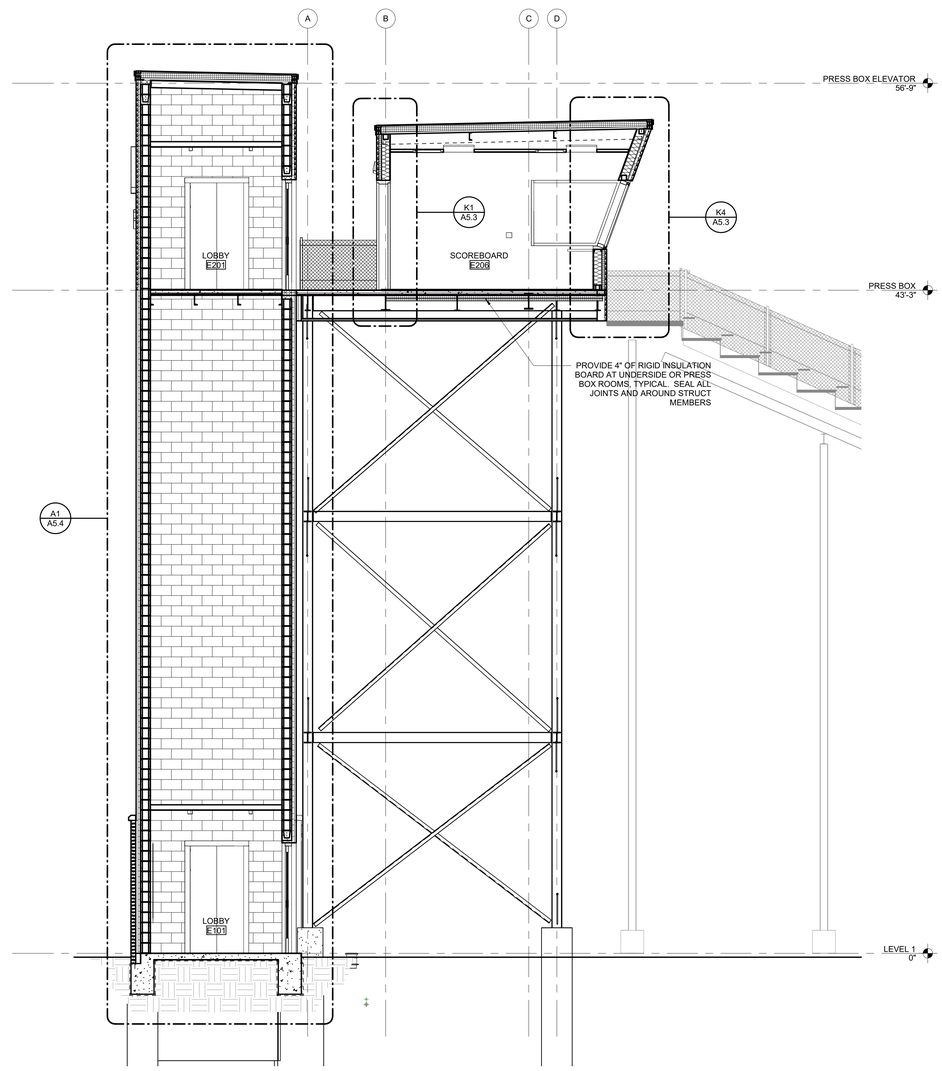
K4 WALL SECTION - PRESS BOX
1/2" = 1'-0"



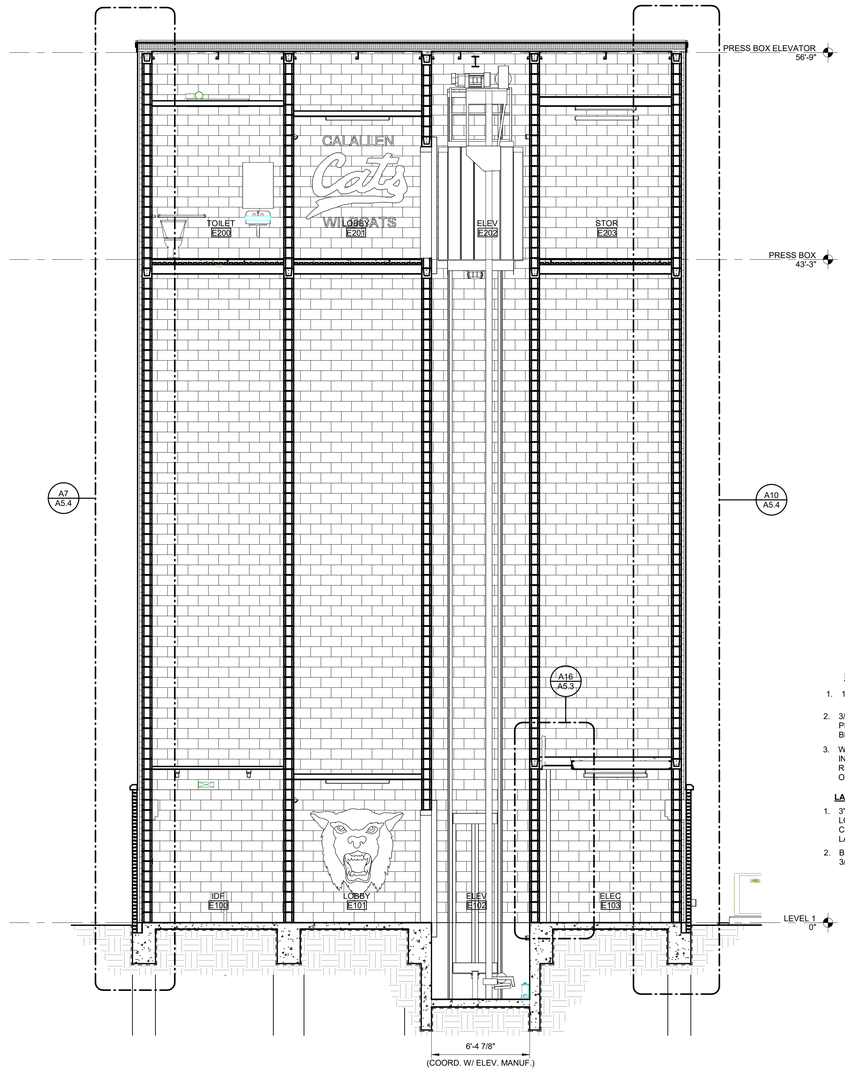
K7 WALL SECTION - PRESS BOX
1/2" = 1'-0"



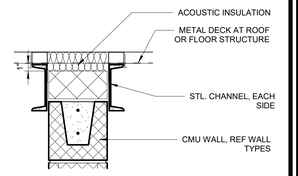
K10 PERIMETER WALL BASE DETAIL - PRESS BOX
3" = 1'-0"



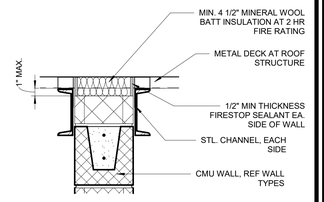
A1 BUILDING SECTION - PRESS BOX
1/4" = 1'-0"



A9 BUILDING SECTION - ELEVATOR TOWER
1/4" = 1'-0"



NON-RATED WALL
(PARALLEL OR PERPENDICULAR TO DECK)



FIRE RATED WALL
(PARALLEL OR PERPENDICULAR TO DECK)
UL NO. HW-D-0013

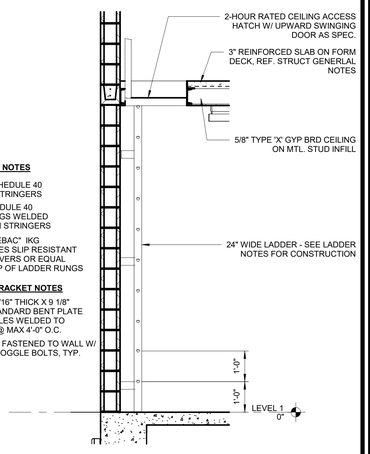
G16 CMU WALLS TO DECK DETAILS
1 1/2" = 1'-0"

LADDER NOTES

1. 1 1/4" SCHEDULE 40 PIPE STRINGERS
2. 3/4" SCHEDULE 40 PIPE RUNGS WELDED BETWEEN STRINGERS
3. WELD "MEBAC" IKG INDUSTRIES SLIP RESISTANT RUNG COVERS OR EQUAL OVER TOP OF LADDER RUNGS

LADDER BRACKET NOTES

1. 3" WIDE 5/16" THICK X 9 1/8" LONG STANDARD BENT PLATE CLIP ANGLES WELDED TO LADDER @ MAX 4'-0" O.C.
2. BRACKET FASTENED TO WALL W/ 3/8" DIA. TOGGLE BOLTS, TYP.



A16 ACCESS LADDER / HATCH DETAIL
1/2" = 1'-0"

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REGISTERED ARCHITECT WILLIAM BERGER 19288 STATE OF TEXAS
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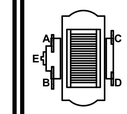

PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX BUILDING & WALL SECTIONS

SHEET NUMBER
A5.3

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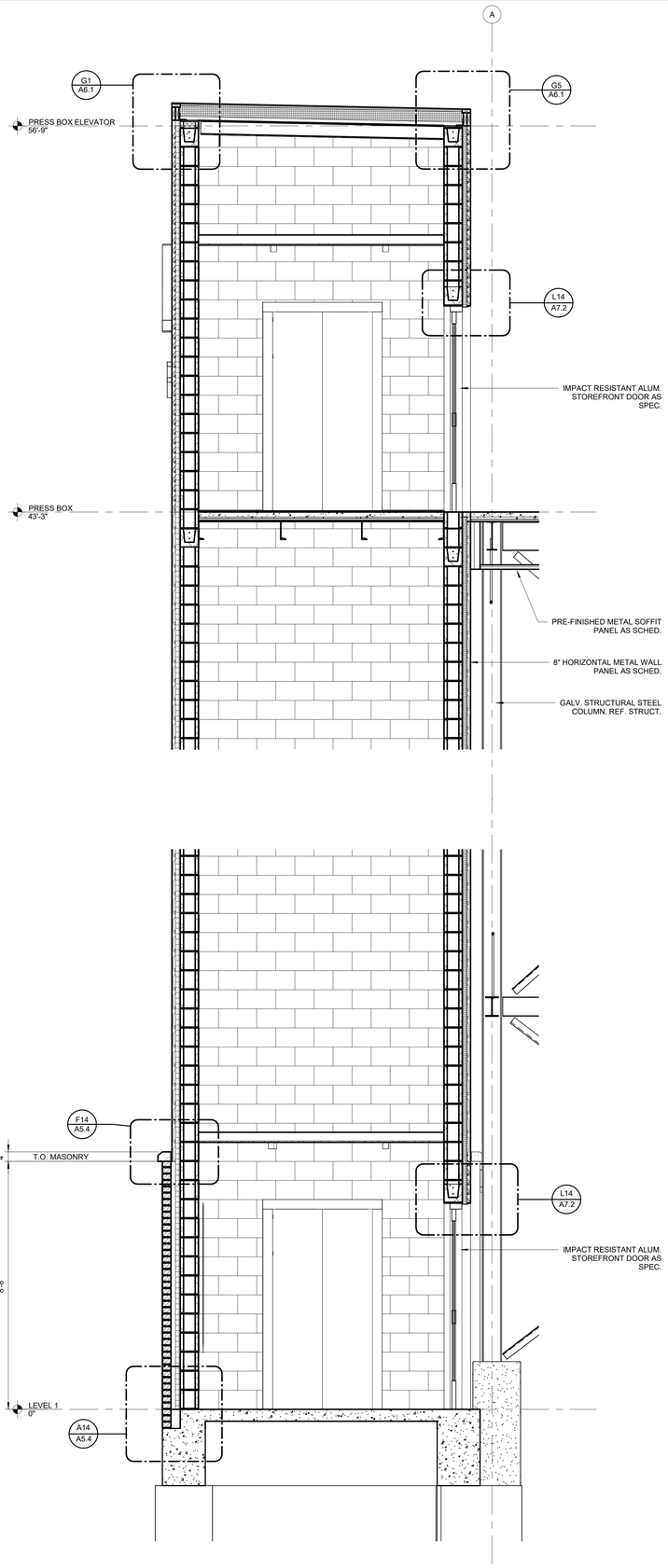
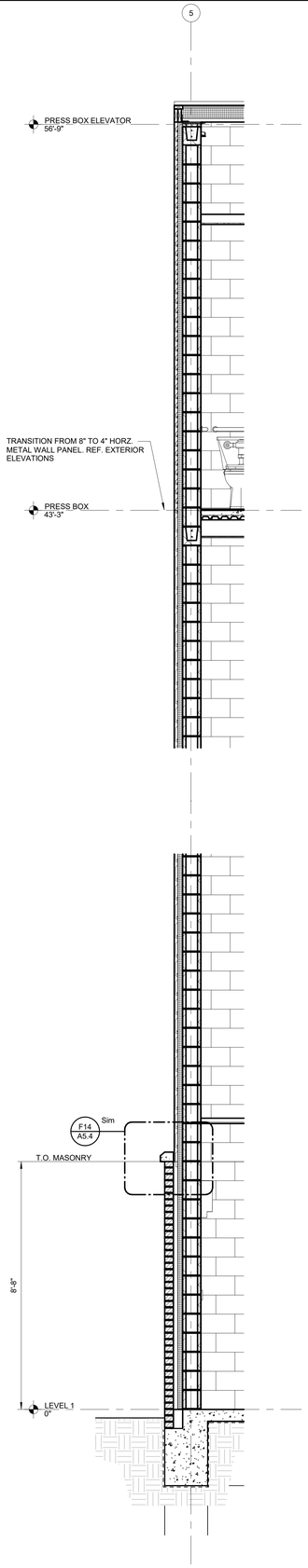
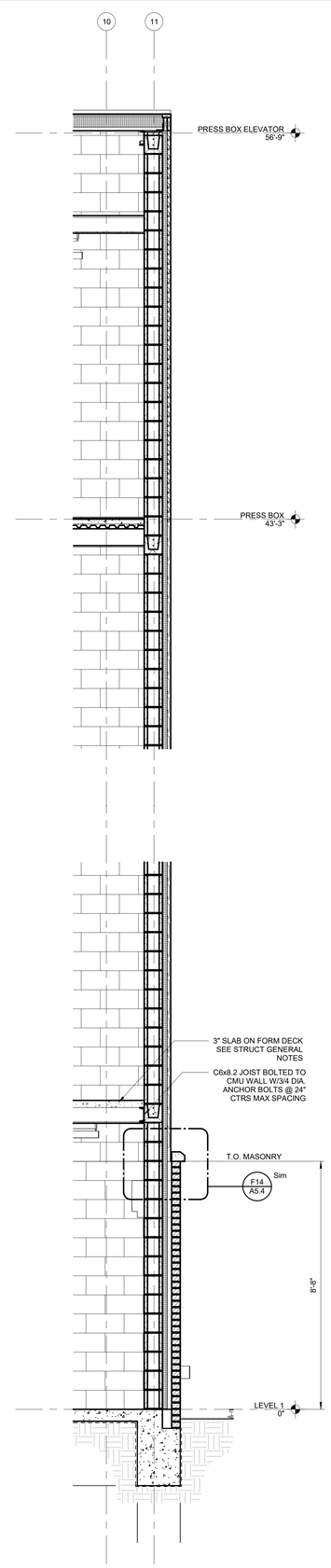


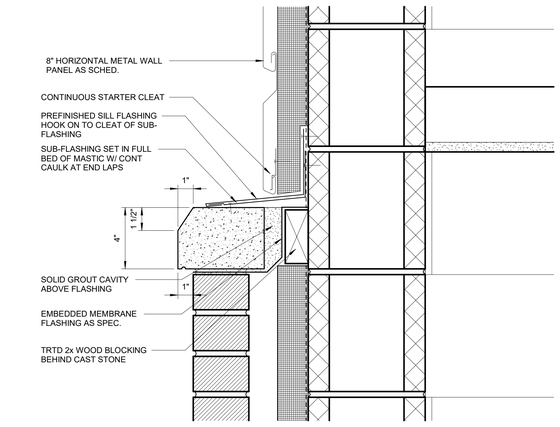
A1 WALL SECTION
1/2" = 1'-0"



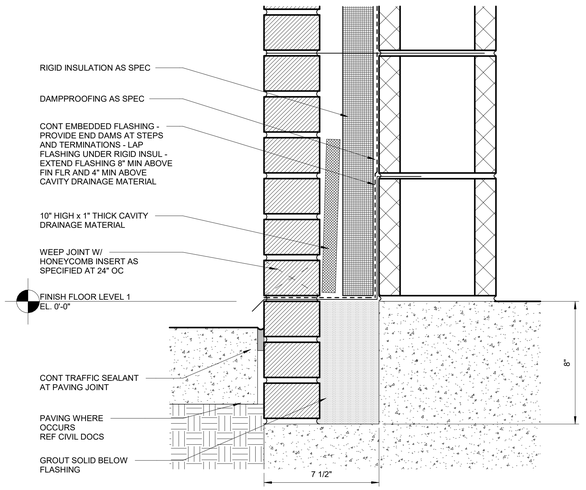
A7 WALL SECTION
1/2" = 1'-0"



A10 WALL SECTION
1/2" = 1'-0"



F14 CAST STONE TRANSITION DETAIL
3" = 1'-0"



A14 BRICK LEDGE AT PAVING / FLATWORK DETAIL
3" = 1'-0"

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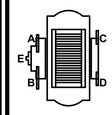

PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX WALL SECTIONS

SHEET NUMBER
A5.4

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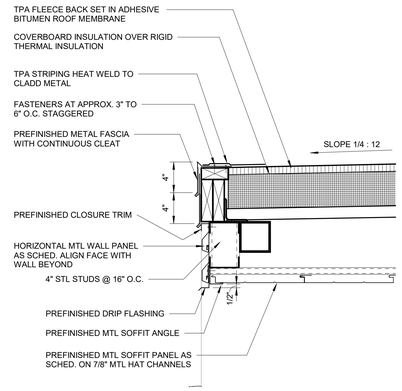
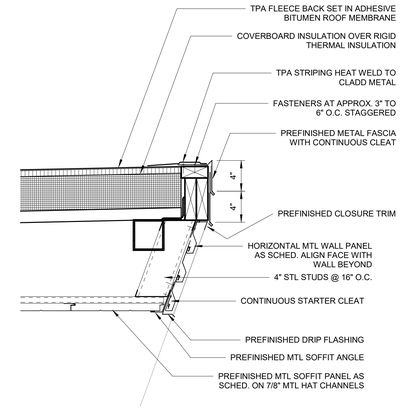
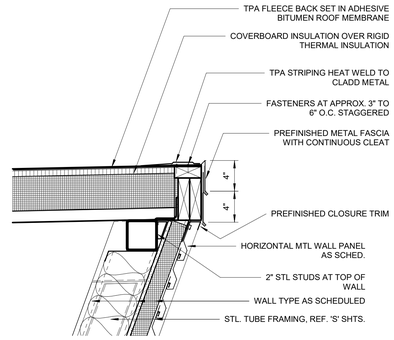


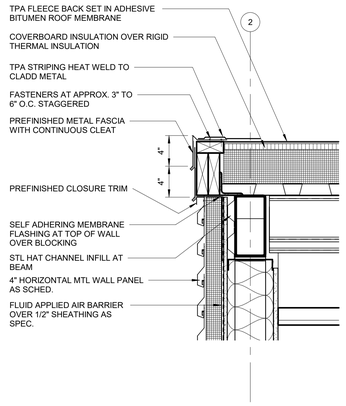
L1 LOW EAVE / SOFFIT DETAIL - FILMING DECK
1 1/2" = 1'-0"



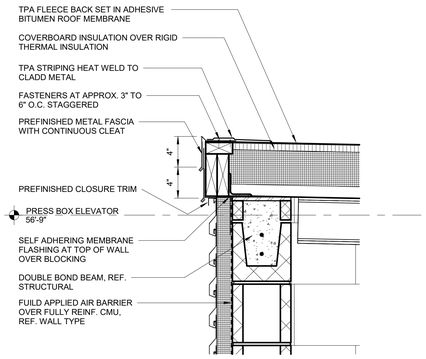
L5 HIGH EAVE / SOFFIT DETAIL - FILMING DECK
1 1/2" = 1'-0"



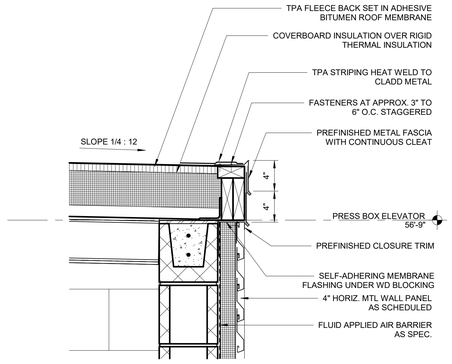
L9 HIGH EAVE DETAIL - PRESS BOX
1 1/2" = 1'-0"



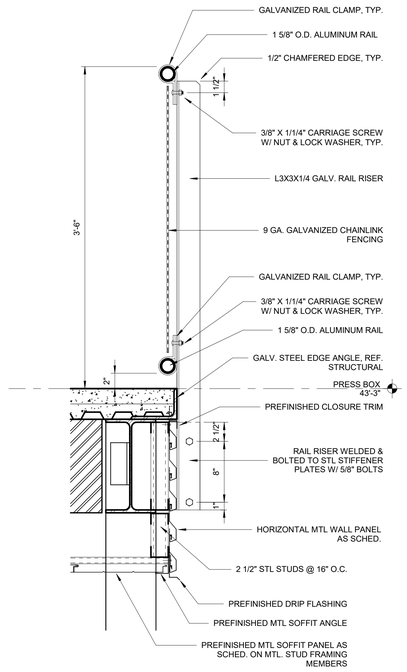
L12 RAKE DETAIL - PRESS BOX
1 1/2" = 1'-0"



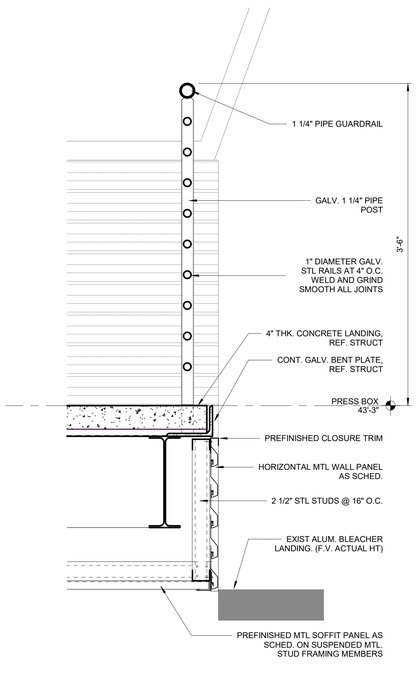
G1 HIGH EAVE DETAIL - ELEVATOR
1 1/2" = 1'-0"



G5 LOW EAVE DETAIL - ELEVATOR
1 1/2" = 1'-0"



A1 PRESS BOX PERIMETER GUARDRAIL DETIAL
1 1/2" = 1'-0"



A5 FILMING DECK GUARDRAIL DETAIL
1 1/2" = 1'-0"

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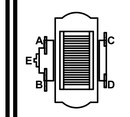


PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX SECTION & ROOF DETAILS

SHEET NUMBER
A6.1

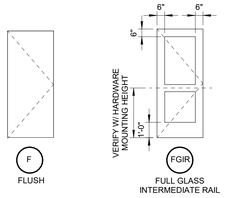
DOOR SCHEDULE

DOOR NUMBER	DOOR TYPE	FIRE RATING	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR SIZE THICKNESS	DOOR MATERIAL	DOOR GLAZING	FRAME TYPE	FRAME MATERIAL	DETAILS HEAD	DETAILS JAMB	DETAILS SILL	REMARKS
A100A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				2, 4
A100B	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				2, 4
A101A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				2, 4
A101B	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/A7.1	A2/A7.1	
A101C	NA		4'-0"	7'-0"	1 3/4"	NA	NA	S1	STL	D6/A7.1	A6/A7.1		7
A102A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/A7.1	A2/A7.1	2
A102B	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/A7.1	A2	2
B100	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/A7.1	A2/A7.1	2, 5
B101	NA		3'-6"	7'-0"	1 3/4"	NA	NA	S1	STL				7
B102A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4, 2
B102B	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4, 2
B103A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4, 2
B103B	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/A7.1	A2/A7.1	2
B103C	NA		4'-0"	7'-0"	1 3/4"	NA	NA	S1	STL				7
B104A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/A7.1	A2/A7.1	2
B104B	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4, 2
B105	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/A7.1	A2/A7.1	2
C100	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/7.1	A2/A7.1	2, 5
C101	NA		3'-6"	7'-0"	1 3/4"	NA	NA	S1	STL				7
C102A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4,2
C102B	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4,2
C103A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4,2
C103B	NA		4'-0"	7'-0"	1 3/4"	NA	NA	S1	STL				7
C104	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/7.1	A2/A7.1	2
D100	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/A7.1	A2/A7.1	2
D101	NA		3'-6"	7'-0"	1 3/4"	NA	NA	S1	STL				7
D102A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4, 2
D102B	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4, 2
D103A	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL				4, 2
D103B	NA		4'-0"	7'-0"	1 3/4"	NA	NA	S1	STL				7
D104	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	D9/A7.1	A9/A7.1	A2/A7.1	2
E100	F		3'-0"	7'-0"	1 3/4"	STL	NA	S2	STL	G15/A7.1	D15/A7.1	A2/A7.1	2, 6
E101	FGIR		6'-0"	7'-0"		ALUM	GL-2		ALUM	L14/A7.2	G14/A7.2	E2/A7.1	1, 3
E103	F		3'-0"	7'-0"	1 3/4"	STL	NA	S2	STL	G15/A7.1	D15/A7.1	A2/A7.1	2, 6
E200	F		3'-0"	7'-0"	1 3/4"	STL	NA	S2	STL	D5/A7.2	D9/A7.2		2, 6, 5
E201	FGIR		6'-0"	7'-0"		ALUM	GL-2		ALUM	L14/A7.2	G14/A7.2	E2/A7.1	1, 3
E203	F		3'-0"	7'-0"	1 3/4"	STL	NA	S2	STL	D5/A7.2	D9/A7.2		2, 6
E204	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	L5/A7.2	G5/A7.2		2
E205	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	L5/A7.2	G5/A7.2		2
E206	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	L5/A7.2	G5/A7.2		2
E207	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	L5/A7.2	G5/A7.2		2
E208	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	L5/A7.2	G5/A7.2		2
E209	F		3'-0"	7'-0"	1 3/4"	STL	NA	S1	STL	L5/A7.2	G5/A7.2		2

Grand total: 43

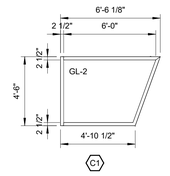
DOOR NOTES:

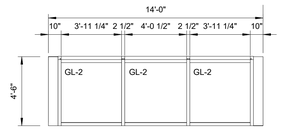
1. INTERIOR THRESHOLDS SHOULD NOT EXCEED 1/2" IN HEIGHT AND SHALL BE BEVELED WITH A SLOPE NO GREATER THAN 1:2.
2. DOOR HANDLES, PULLS, LATCHES. LOCKS AND OTHER OPERATING DEVICES ON DOORS SHALL BE MOUNTED AT 3'-6" A.F.F. AND SHALL HAVE A SHAPE THAT IS EASY TO GRASP WITH ONE HAND AND DOESN'T REQUIRE TIGHT GRASPING OR PINCHING, OR SEVERE TWISTING TO OPERATE.
3. THE FORCE REQUIRED TO ACTIVATE DOOR HARDWARE AND OPEN DOORS SHOULD BE NO GREATER THAN 5 LBFT FOR INTERIOR DOORS.
4. DOORS TO HAZARDOUS AREAS SUCH AS LOADING PLATFORMS, BOILER ROOMS, MECHANICAL AND ELECTRICAL ROOMS AND OTHER AREAS THAT MIGHT BE DANGEROUS TO A BLIND PERSON SHALL BE MADE IDENTIFIABLE TO THE TOUCH BY A TEXTURED SURFACE ON THE DOOR HANDLE OR OTHER DOOR OPERATING HARDWARE.
5. THE SWEEP PERIOD ON ANY DOORS WITH CLOSERS SHOULD BE ADJUSTED SO THAT FROM ANY OPEN POSITION OF 70 DEGREES THE DOOR WILL TAKE AT LEAST 3 SECONDS TO MOVE TO A POINT 3" FROM THE LATCH, MEASURED FROM THE LEADING EDGE OF THE DOOR.
6. ADJUST CUT-OFF AT BOTTOM OF ANY EXTERIOR HOLLOW METEL DOORS WITH HANDICAP ACCESSIBLE THRESHOLDS TO INSURE THAT THERE IS NO GAP BETWEEN THE BOTTOM OF THE DOOR AND THE TOP OF THRESHOLD SEAT.
7. ALL DOORS SHALL MEET T.A.S. REQUIREMENTS FOR CLEARANCES, HARDWARE, ETC.

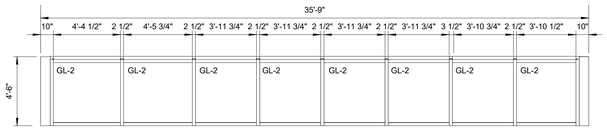


FLUSH

FULL GLASS INTERMEDIATE RAIL

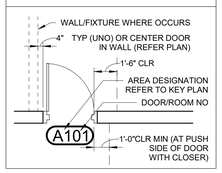






N6 DOOR TYPES
1/4" = 1'-0"

DOOR MARK LEGEND



FRAME TYPE LEGEND

- S# STEEL (HM) FRAME TYPE
- A# ALUMINUM (STOREFRONT) FRAME TYPE
- C# ALUMINUM (CURTAINWALL) FRAME TYPE
- L# LOUVER TYPE, REF MECHANICAL DRAWINGS

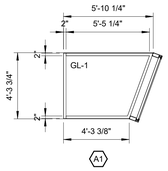
GLAZING LEGEND

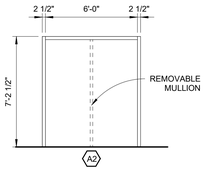
REF SHEET A8.0 MATERIAL SCHEDULE FOR GLASS TYPES
GL-1 CLEAR INSUL SAFETY GLASS
GL-2 TINTED INSUL SAFETY GLASS

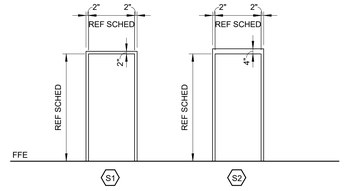
DOOR SCHEDULE REMARKS

1. PROVIDE REMOVABLE MULLION.
2. PROVIDE DRIP AT HEAD OF DOOR
3. IMPACT RESISTANT DOOR, FRAME & GLAZING AS. SPEC.
4. EXISTING FRAME TO RECEIVE NEW DOOR AND HARDWARE.
5. PROVIDE SINGLE SIDED DEADBOLT WITH OCCUPANCY I NDICATOR.
6. FRAME HEAD MTO BE 4" TALL. TOP OF FRAME TO BE 7'-4".
7. CASED OPENING.

N9 CURTAINWALL FRAME TYPES
1/4" = 1'-0"

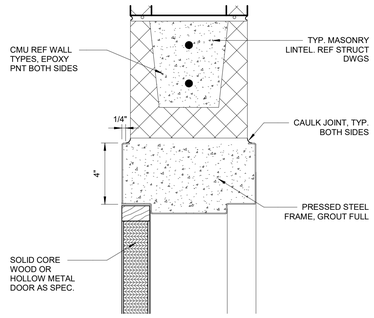




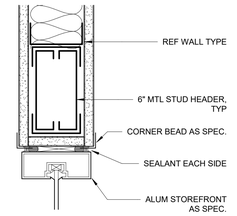


L9 STOREFRONT FRAME TYPES
1/4" = 1'-0"

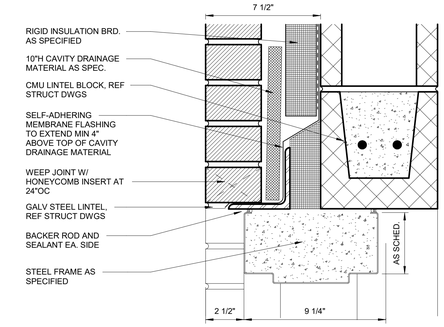
L13 STEEL FRAME TYPES
1/4" = 1'-0"



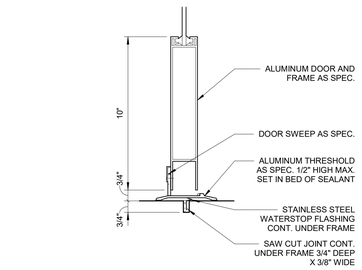
G9 PRESSED STEEL HEAD DETAIL
3" = 1'-0"



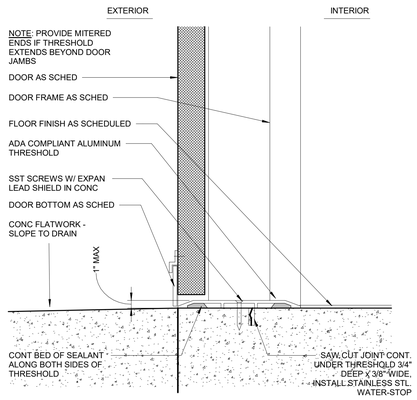
G12 ALUM. STOREFRONT HEAD
3" = 1'-0"



G15 STEEL FRAME HEAD DETAIL
3" = 1'-0"



E2 ALUM DOOR THRESHOLD DETAIL
3" = 1'-0"



A2 EXT. THRESHOLD DETAIL
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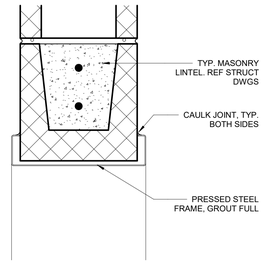
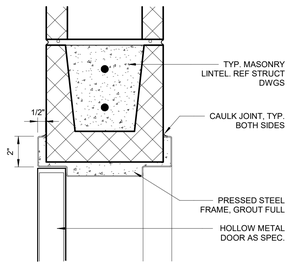
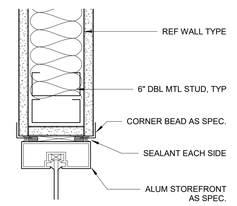


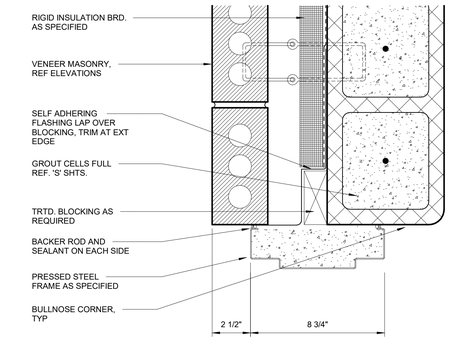
D6 PRESSED STEEL HEAD DETAIL
3" = 1'-0"



D9 PRESSED STEEL HEAD DETAIL
3" = 1'-0"



D12 ALUM. STOREFRONT JAMB
3" = 1'-0"



D15 STEEL FRAME JAMB DETAIL
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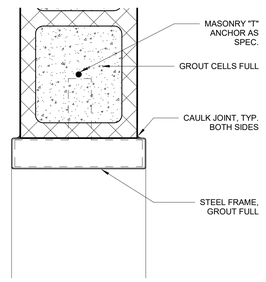

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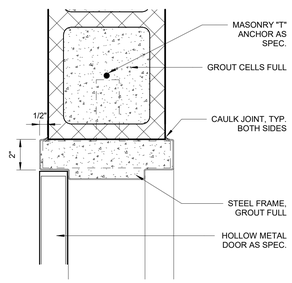

A9 PRESSED STEEL JAMB DETAIL
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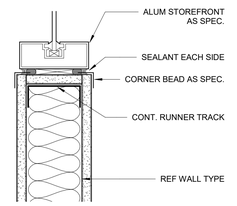

A12 ALUM. STOREFRONT SILL
3" = 1'-0"

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WILLIAM BERGER
REGISTERED ARCHITECT
REGISTRATION NO. 19288
STATE OF TEXAS

REGISTERED ARCHITECT WILLIAM M. BERGER 19288 STATE OF TEXAS
11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
CALALLEN INDEPENDENT SCHOOL DISTRICT
4001 Wildcat Dr., Corpus Christi, TX 78410

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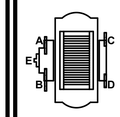
DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
DOOR SCHEDULE, DETAILS & WINDOW ELEVATIONS

SHEET NUMBER
A7.1

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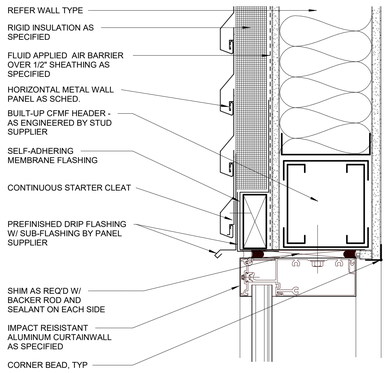
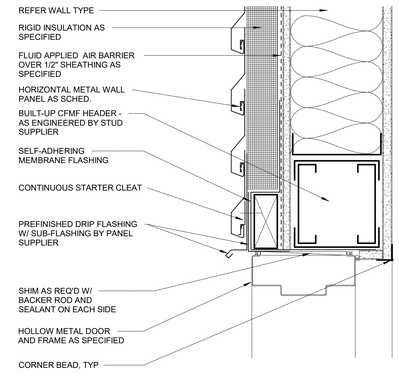
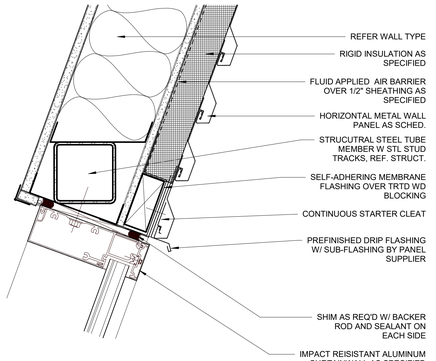


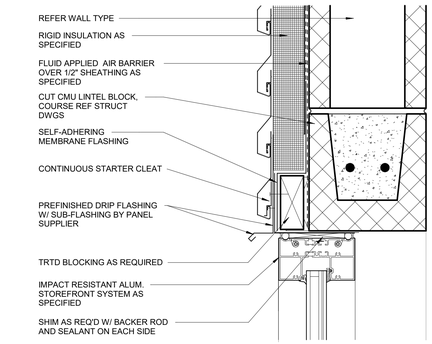
L1 CURTAINWALL HEAD DETAIL
3" = 1'-0"



L5 STEEL HEAD DETAIL
3" = 1'-0"



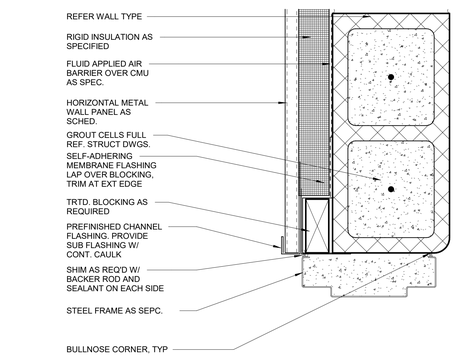
L9 CURTAINWALL HEAD DETAIL
3" = 1'-0"



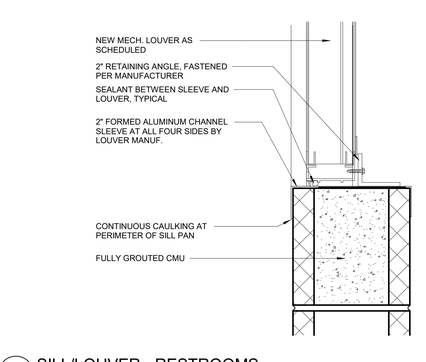
L14 ALUM HEAD DETAIL
3" = 1'-0"

G1 CURTAINWALL JAMB DETAIL
3" = 1'-0"

G5 STEEL JAMB DETAIL
3" = 1'-0"



G9 CURTAINWALL SILL DETAIL
3" = 1'-0"



G14 ALUM JAMB DETAIL
3" = 1'-0"

D1 CURTAINWALL SILL DETAIL
3" = 1'-0"

D5 STEEL HEAD DETAIL
3" = 1'-0"

D9 STEEL JAMB DETAIL
3" = 1'-0"

G14 HEAD/LOUVER - RESTROOMS
3" = 1'-0"

A9 JAMB/LOUVER - RESTROOMS
3" = 1'-0"

A14 SILL/LOUVER - RESTROOMS
3" = 1'-0"

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11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 Wildcat Dr., Corpus Christi, TX 78410

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DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)

PLAN NORTH
TRUE NORTH

SHEET NAME
HEAD JAMB, & SILL DETAILS

SHEET NUMBER
A7.2

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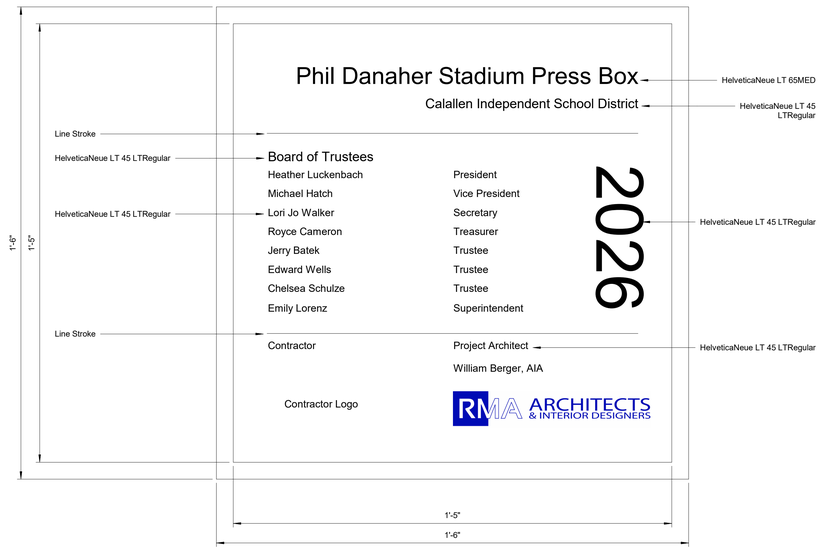
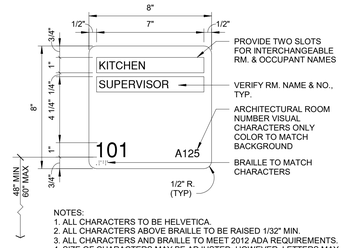
MATERIAL SCHEDULE

MATERIAL	MARK	MANUFACTURER	STYLE	MFR. NO.	COLOR	LOCATION
ACOUSTIC PANEL CEILING	APC1	ARMSTRONG, 24x24	SCHOOL ZONE FINE FISSURED	465	WHITE	
ALUMINUM CURTAINWALL	CL1	KAWNEER	IMPACT RESISTANT	1600(IR) SYSTEM I	DARK BRONZE	PRESS BOX WINDOWS
ALUMINUM STOREFRONT	AL1	KAWNEER	INTERIOR	VG 451T	DARK BRONZE	PRESS BOX, INTERIOR WALLS
ALUMINUM STOREFRONT	AL2	KAWNEER	IMPACT RESISTANT	IR 501T	DARK BRONZE	EXTERIOR DOORS
BRICK	BK1	ACME	MODULAR - BLEND	-	COLOR BLEND	TO MATCH EXISTING FIELD HOUSE
CAST STONE	CS1	STONE CASTEL INDUSTRIES	-	100-530	-	MASONRY VENEER CAP
CERAMIC FLOOR TILE	CT3	ANATOLIA-CERAFORGE	RECTIFIED MATTE - 24"x24"	-	TITANIUM	PRESS BOX RESTROOM
CERAMIC WALL TILE	CT1	ANATOLIA-CERAFORGE	BULLNOSE MATTE - 3"x24"	-	TITANIUM	PRESS BOX RESTROOM
CONCRETE MASONRY UNIT	CMU1	HEADWATERS				REFER TO FLOOR PLANS
EPOXY RESIN FLOOR	ERF1	SHERWIN WILLIAMS HPF	RESULOR SCREED DECO FLAKE II		COLOR BLEND AS SPECIFIED	STADIUM RESTROOMS
GLASS	GL-1	PPG	SOLARBAN 60 (3) + CLEAR	-	CLEAR	INTERIOR GLAZING
GLASS	GL-2	PPG	SOLARBAN 60 (2) + CLEAR IMPACT RESISTANT	-	SOLARCOOL (2) + SOLARGRAY	EXTERIOR GLAZING
GROUT	GT1	LATICRETE	-	60	DUSTY GREY	ALL FLOOR TILE AND BASE
LUXURY VINYL TILE	LVT1	MOHAWK GROUP	HOT & HEAVY II	949	LAVA	ELEVATOR TOWER, PRESS BOX
METAL ROOF	MR1	BERRIDGE	DOUBLE-LOCK ZEE-LOCK	KYNAR 500	DARK BRONZE	STADIUM ENTRANCES
METAL SOFFIT PANEL	MS1	BERRIDGE	L-PANEL	KYNAR 500	ALMOND	STADIUM ENTRANCES, PRESS BOX
METAL WALL PANEL	MP1	BERRIDGE	HR-16	KYNAR 500	ALMOND	ELEVATOR TOWER
METAL WALL PANEL	MP2	BERRIDGE	HS-8	KYNAR 500	ALMOND	ELEVATOR TOWER, PRESS BOX
METAL WALL PANEL	MP3	BERRIDGE	HR-4	KYNAR 500	ALMOND	STADIUM ENTRANCE FASCIA, PRESS BOX
PAINT	P1	SHERWIN WILLIAMS	-	SW 6203	SPARE WHITE	STANDARD WALL COLOR
PAINT	P2	SHERWIN WILLIAMS	-	SW 7653	SILVERPOINTE	ACCENT COLOR
PAINT	P3	SHERWIN WILLIAMS	-	SW 7649	SILVERPLATE	ACCENT COLOR
PAINT	P4	SHERWIN WILLIAMS	-	SW 7673	PEWTERCAST	ACCENT COLOR
PAINT	P5	SHERWIN WILLIAMS	-	SW 7674	PEPPERCORN	ACCENT COLOR
PAINT	P6	SHERWIN WILLIAMS	-	SW 6034	ARRESTING AUBURN	ACCENT COLOR
PAINT	P7	SHERWIN WILLIAMS	-	SW 7020	BLACK FOX	HM DOOR FRAMES, STEEL DOORS, EXIST METAL FASCIA
PAINT	P8	SHERWIN WILLIAMS	-	SW 6258	TRICORN BLACK	EXPOSED STEEL STRUCTURE/COLUMNS @ ENTRANCES
PAINT	P9	SHERWIN WILLIAMS	-	SW 7542	NATUREL	RESTROOMS, CONCESSIONS, BOOSTER BLDG EXTERIORS
PLASTIC LAMINATE	PL1	PIONITE	TEXTURED SUEDE	AEO21-SD	GRAPHITE SPEKTRUM	COUNTERTOPS, WINDOW SILLS
PREFINISHED METAL	PM1	BERRIDGE	-	KYNAR 500	DARK BRONZE	GUTTERS, DOWNSPOUTS, RAKES, EXTERIOR METAL TRIM, BUILDING SIGNAGE, METAL LOCKERS
PREFINISHED METAL	PM2	BERRIDGE	-	KYNAR 500	ALMOND	LOUVERS
RUBBER BASE	RB1	JOHNSONITE / TARKET	4" COVE	85	BURGUNDY	ELEVATOR TOWER, PRESS BOX
SEALED CONCRETE	SC1	-	-	-	-	
TOILET PARTITION	TP1	SCRANTON PRODUCTS	ORANGE PEEL		MAHOGANY	RESTROOMS

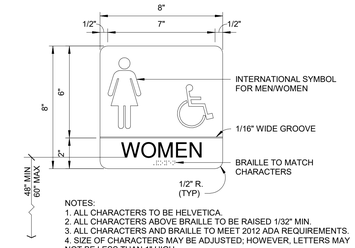


A5 PLAQUE DETAIL
12" = 1'-0"



NOTES:
1. ALL CHARACTERS TO BE HELVETICA.
2. ALL CHARACTERS ABOVE BRAILLE TO BE RAISED 1/32" MIN.
3. ALL CHARACTERS AND BRAILLE TO MEET 2012 ADA REQUIREMENTS.
4. SIZE OF CHARACTERS MAY BE ADJUSTED; HOWEVER, LETTERS MAY NOT BE LESS THAN 5/8" HIGH.
5. SIGN FACE & BACK SHALL BE AS SPECIFIED.

A12 TYPICAL INTERIOR SIGN
3" = 1'-0"



NOTES:
1. ALL CHARACTERS TO BE HELVETICA.
2. ALL CHARACTERS ABOVE BRAILLE TO BE RAISED 1/32" MIN.
3. ALL CHARACTERS AND BRAILLE TO MEET 2012 ADA REQUIREMENTS.
4. SIZE OF CHARACTERS MAY BE ADJUSTED; HOWEVER, LETTERS MAY NOT BE LESS THAN 1" HIGH.
5. SIGN FACE & BACK SHALL MATCH "P7".
6. PROVIDE SIGN AT ALL RESTROOMS.

A15 TYPICAL HANDICAP SIGN
3" = 1'-0"

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WILLIAM BERGER
REGISTERED ARCHITECT
REGISTRATION NO. 19288
STATE OF TEXAS



11/11/2025

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CALALLEN INDEPENDENT SCHOOL DISTRICT

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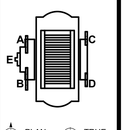

PLAN NORTH
TRUE NORTH

SHEET NAME
MATERIAL SCHEDULE

SHEET NUMBER
A8.0

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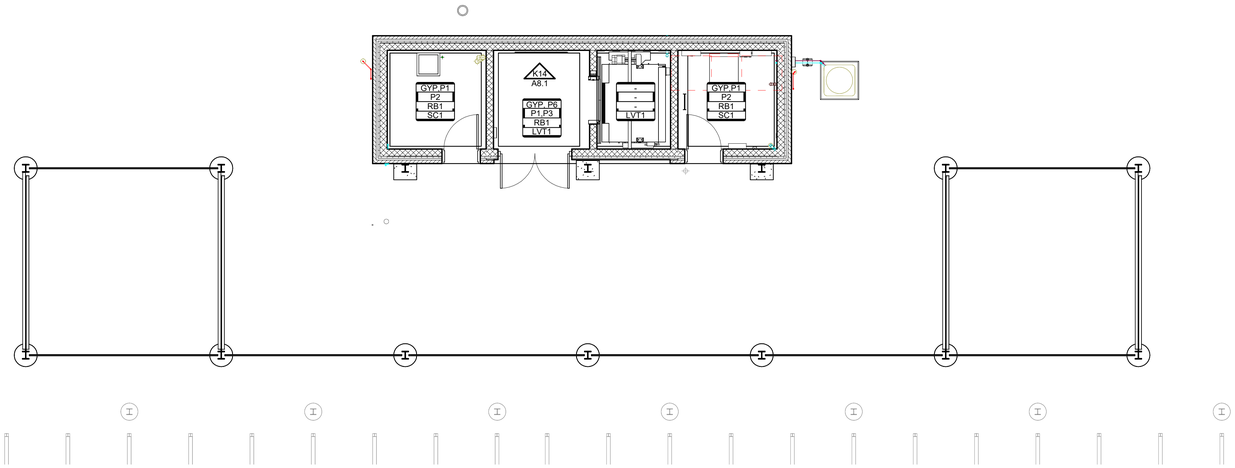
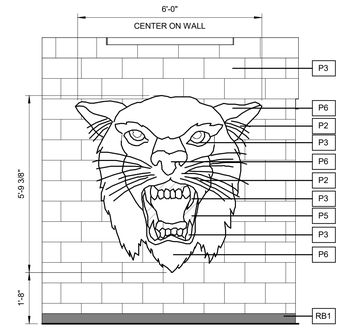
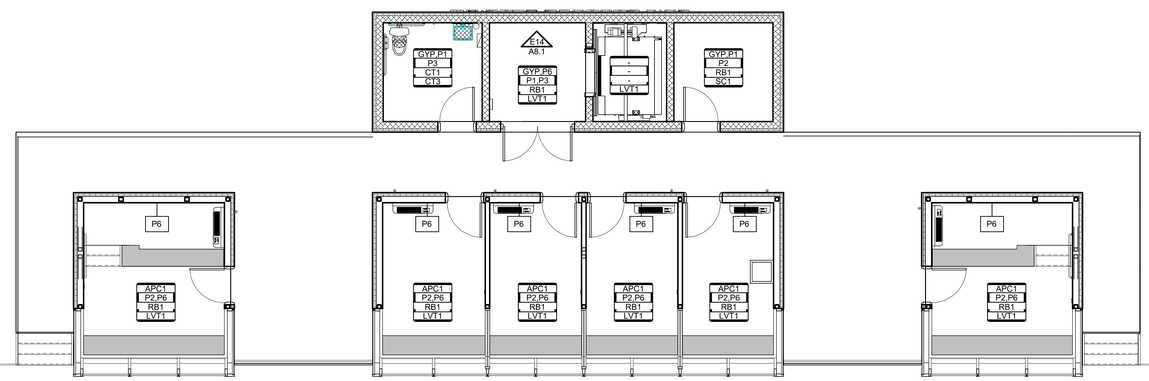


K1 LEVEL 1 FINISH PLAN
3/16" = 1'-0"



K14 LOBBY E101 - NORTH ELEVATION
1/2" = 1'-0"



A1 PRESS BOX LEVEL FINISH PLAN
3/16" = 1'-0"

E14 LOBBY E201 - NORTH ELEVATION
1/2" = 1'-0"

FINISH TAG KEY

APC2 / P1 / RB1 / VCT.6	CEILING TYPE / WALL FINISH, UNO / BASE TYPE / FLOOR FINISH
1	FINISH KEYNOTE
P1	MATERIAL TAG (REF SHEET A8.0 FOR MATERIAL SCHEDULE)

RMA ARCHITECTS & INTERIOR DESIGNERS
311 E. Constitution St., Ste 210
Victoria, Texas 77901
www.rmaarch.com

WILLIAM BERGER
REGISTERED ARCHITECT
REGISTRATION NO. 19288
STATE OF TEXAS

11/11/2025

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 Wildcat Dr, Corpus Christi, Texas 78410

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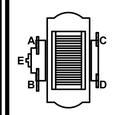
DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
PRESS BOX FINISH PLANS

SHEET NUMBER
A8.1

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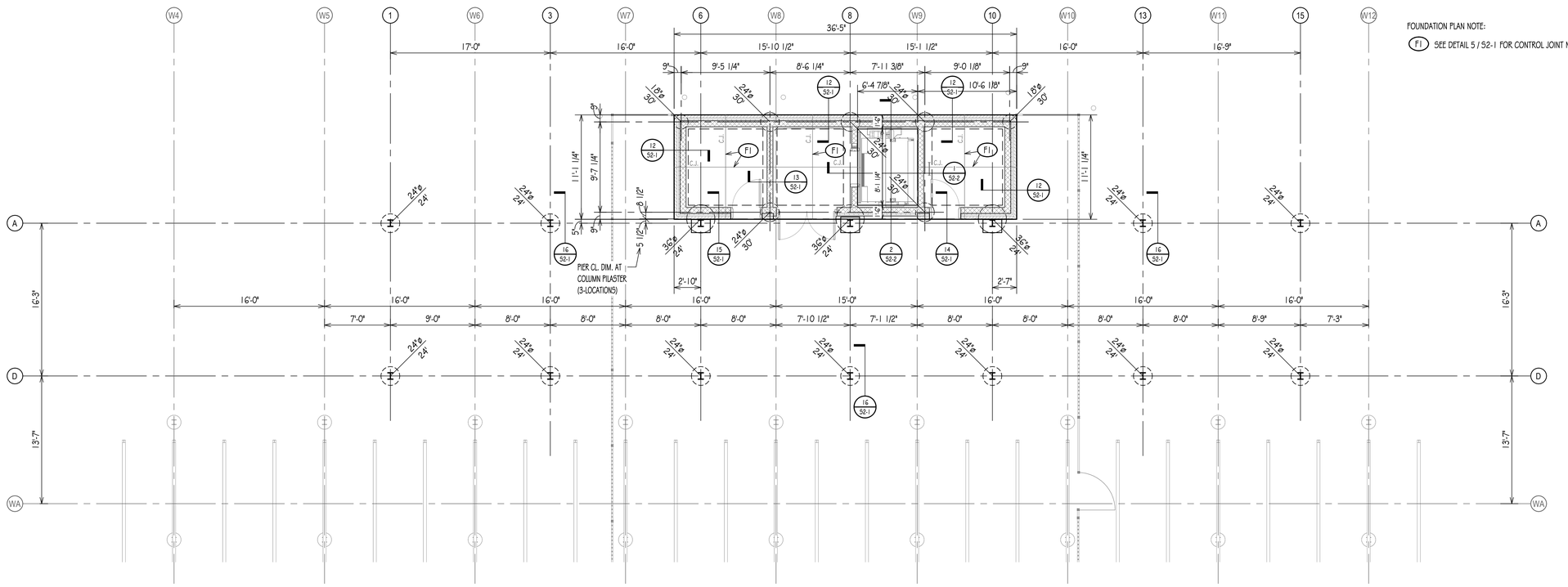


PRESS BOX FOUNDATION PLAN

SCALE: 3/16" = 1'-0"

PLAN NORTH
NOT TRUE NORTH

FOUNDATION PLAN NOTE:

F1 SEE DETAIL 5 / S2-1 FOR CONTROL JOINT NOTES.

EXISTING CONDITIONS NOTE:
CONTRACTOR MUST FIELD VERIFY ALL EXISTING DIMENSIONS, ELEVATIONS AND CONDITIONS PRIOR TO CONSTRUCTION. CONTRACTOR MUST EXPOSE ALL EXISTING CONDITIONS AS REQUIRED TO VERIFY THAT CONDITIONS MATCH WHAT ARE SHOWN ON THE STRUCTURAL DRAWINGS. CONDITIONS THAT DEVIATE FROM THOSE SHOWN ON THE DRAWINGS MUST BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT AND ENGINEER. DETAILS SHOWN ON THE CONTRACT DOCUMENTS ARE SUBJECT TO CHANGE PENDING FINAL FIELD VERIFICATION BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE EXISTING CONDITIONS AS EARLY AS POSSIBLE IN THE JOB PRIOR TO ORDERING OR PURCHASING ANY MATERIALS.

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO STARTING WORK.

LOCATE ALL UTILTIY LINES PRIOR TO STARTING WORK.

COORDINATE ALL DEMOLITION WORK WITH THE ARCHITECTURAL PHASING PLAN.

PRESS BOX FOUNDATION PLAN NOTES:

1. 5" THICK CONCRETE SLAB ON COMPACTED FILL. REINF. SLAB WITH #4 @ 16" CTRS. EACH WAY IN CENTER OF SLAB. COVER PREPARED GRADE WITH 10 MIL POLYETHYLENE SHEETING PRIOR TO PLACING CONCRETE.
2. SEE CIVIL DRAWINGS FOR FINISHED GRADE AND FINISHED FLOOR ELEVATIONS. COORDINATE PERIMETER GRADE BEAM DEPTHS WITH FINISHED FLOOR AND FINISHED GRADE ELEVATIONS.
3. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS AND LOCATIONS OF ALL FLOOR DROPS, FLOOR FINISHES AND PLUMBING FIXTURES.
4. VERIFY ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO CASTING CONCRETE.
5. COORDINATE THE LOCATION OF ALL FLOOR DRAIN LOCATIONS WITH THE M.E.P. AND ARCHITECTURAL DRAWINGS. SLOPE FINISH FLOOR TOWARD DRAINS.

BRACE ELEVATION KEYED NOTES:

B1 SEE DETAIL 1 / S3-3 FOR BRACE ELEVATION.

B2 SEE DETAIL 2 / S3-3 FOR BRACE ELEVATION.

B3 SEE DETAIL 3 / S3-3 FOR BRACE ELEVATION.

B4 SEE DETAIL 4 / S3-3 FOR BRACE ELEVATION.

B5 SEE DETAIL 5 / S3-3 FOR BRACE ELEVATION.

B6 SEE DETAIL 6 / S3-3 FOR BRACE ELEVATION.

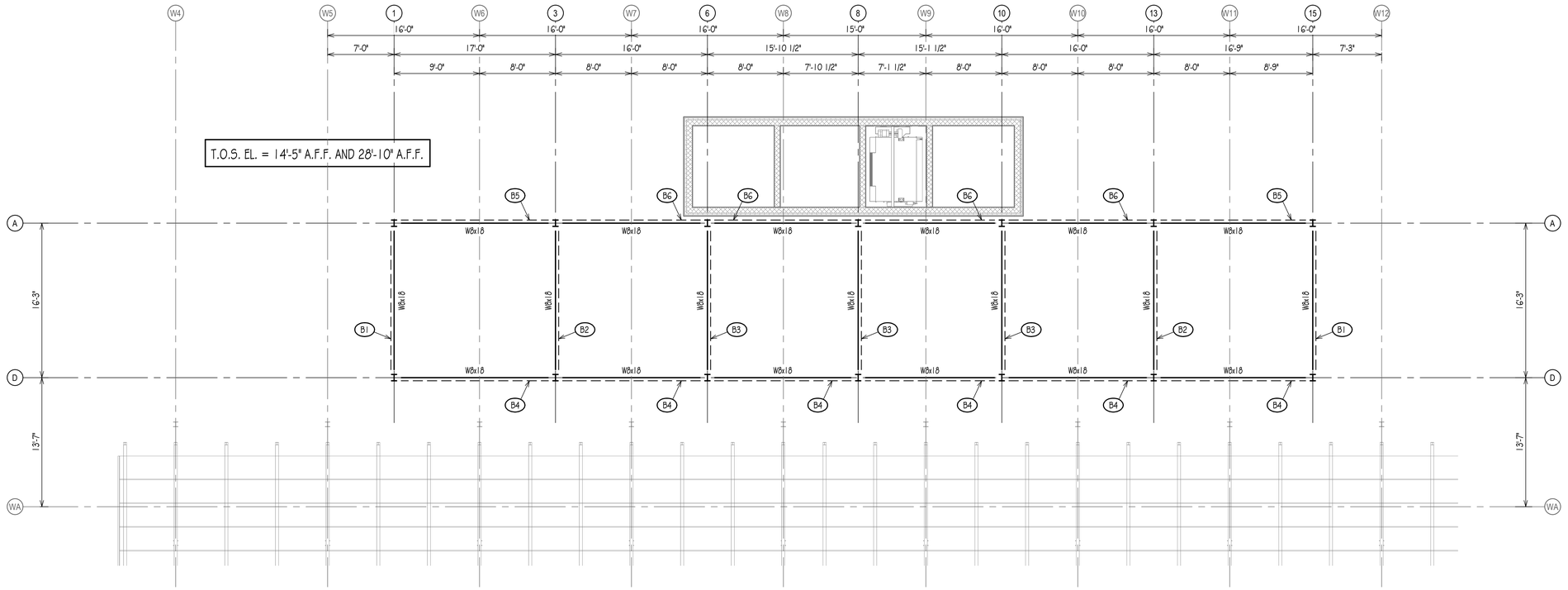
B7 SEE DETAIL 7 / S3-3 FOR BRACE ELEVATION.

B8 SEE DETAIL 1 / S3-2 FOR BRACE ELEVATION.

ALL COLUMNS SHALL BE W8x28 (U.N.O.)

ALL STRUCTURAL STEEL SHALL BE GALVANIZED

T.O.S. EL. = 14'-5" A.F.F. AND 28'-10" A.F.F.



PRESS BOX INTERMEDIATE FRAMING PLAN

SCALE: 3/16" = 1'-0"

PLAN NORTH
NOT TRUE NORTH

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Victoria, Texas 77901
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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 Wildcat Dr., Corpus Christi, TX 78410

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DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

PLAN NORTH / TRUE NORTH

SHEET NAME
PRESS BOX FOUNDATION AND INTERMEDIATE FRAMING PLANS
SHEET NUMBER

S1-1

STATE OF TEXAS
ROBERT ENRIQUEZ MARTINEZ
89387
LICENSED
PROFESSIONAL ENGINEER
11-11-25
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T.B.P.E. FIRM NO. 8944

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(210) 320-1199
robert@remengineeringcorp.com
T.B.P.E. FIRM NO. 8944
REM PROJECT NO: 25-120

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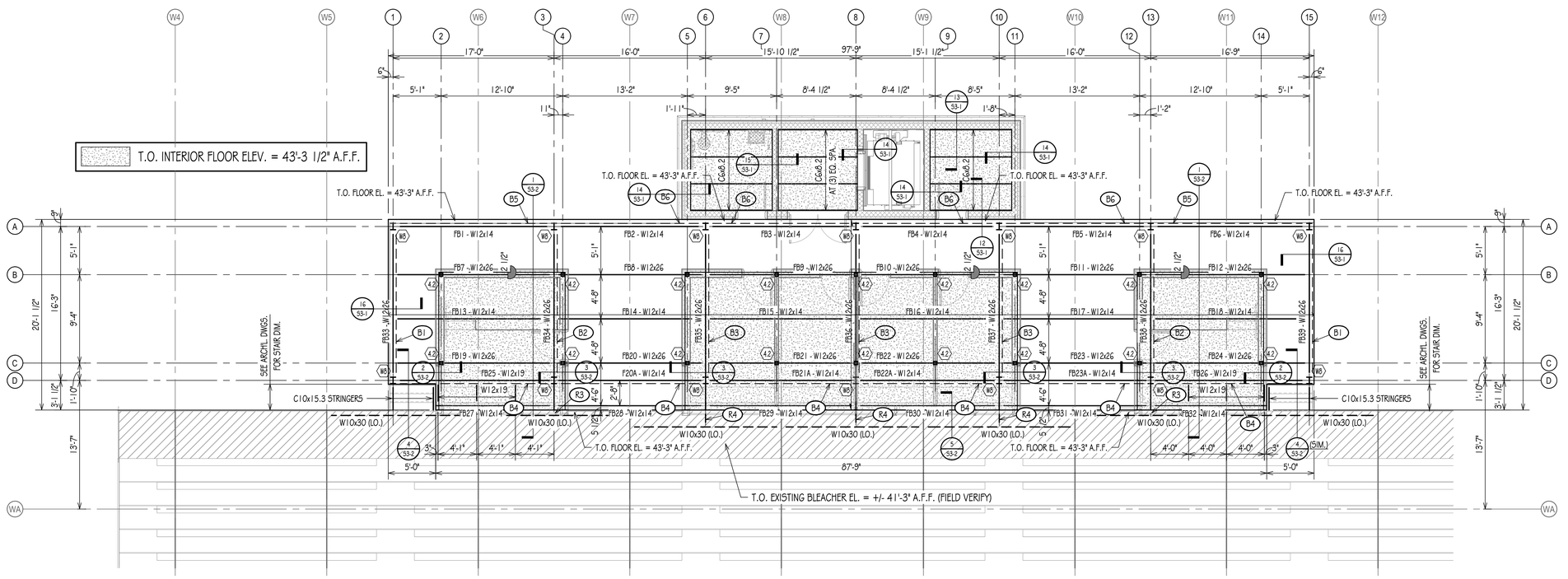
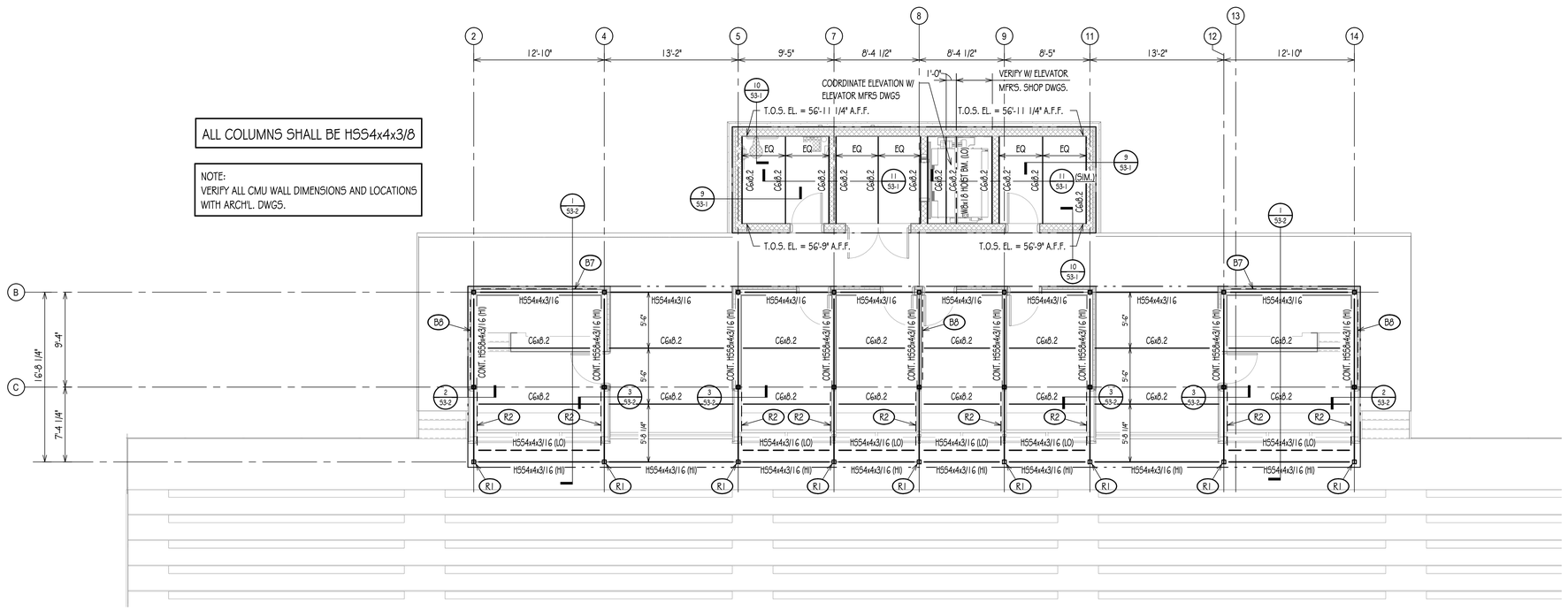


ALL STRUCTURAL STEEL SHALL BE GALVANIZED

PRESS BOX FLOOR FRAMING PLAN

SCALE: 3/16" = 1'-0"

PLAN NORTH
NOT TRUE NORTH



ALL STRUCTURAL STEEL SHALL BE GALVANIZED

PRESS BOX ROOF FRAMING PLAN

SCALE: 3/16" = 1'-0"

PLAN NORTH
NOT TRUE NORTH

EXISTING CONDITIONS NOTE:
CONTRACTOR MUST FIELD VERIFY ALL EXISTING DIMENSIONS, ELEVATIONS AND CONDITIONS PRIOR TO CONSTRUCTION. CONTRACTOR MUST EXPOSE ALL EXISTING CONDITIONS AS REQUIRED TO VERIFY THAT CONDITIONS MATCH WHAT ARE SHOWN ON THE STRUCTURAL DRAWINGS. CONDITIONS THAT DEVIATE FROM THOSE SHOWN ON THE DRAWINGS MUST BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT AND ENGINEER. DETAILS SHOWN ON THE CONTRACT DOCUMENTS ARE SUBJECT TO CHANGE PENDING FINAL FIELD VERIFICATION BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE EXISTING CONDITIONS AS EARLY AS POSSIBLE IN THE JOB PRIOR TO ORDERING OR PURCHASING ANY MATERIALS.

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO STARTING WORK.

LOCATE ALL UTILTIY LINES PRIOR TO STARTING WORK.

COORDINATE ALL DEMOLITION WORK WITH THE ARCHITECTURAL PHASING PLAN.

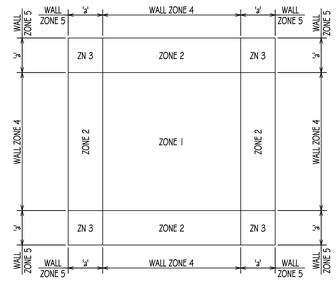
PRESS BOX FRAMING PLAN KEYED NOTES:

- R1 SLOPING HSS4x4x3/16 STUB COLUMN BELOW.
- R2 HSS4x4x3/16 (LO)
- R3 SEE DETAIL 1/S3-2 FOR W10x30 (LO) LATERAL CONNECTION TO COLUMN.
- R4 SEE DETAIL 5/S3-2 FOR W10x30 (LO) LATERAL CONNECTION TO COLUMN.

BRACE ELEVATION KEYED NOTES:

- B1 SEE DETAIL 1 / S3-3 FOR BRACE ELEVATION.
- B2 SEE DETAIL 2 / S3-3 FOR BRACE ELEVATION.
- B3 SEE DETAIL 3 / S3-3 FOR BRACE ELEVATION.
- B4 SEE DETAIL 4 / S3-3 FOR BRACE ELEVATION.
- B5 SEE DETAIL 5 / S3-3 FOR BRACE ELEVATION.
- B6 SEE DETAIL 6 / S3-3 FOR BRACE ELEVATION.
- B7 SEE DETAIL 7 / S3-3 FOR BRACE ELEVATION.
- B8 SEE DETAIL 1 / S3-2 FOR BRACE ELEVATION.

COLUMN SCHEDULE	
MARK	COLUMN SIZE
W6	W8x28
4.2	HSS4x4x3/8 STUB COL. ABOVE



COMPONENTS AND CLADDING WIND PRESSURES (PSF)						
CLADDING ZONE	ZONE 1 - ROOF INTERIOR	ZONE 2 - ROOF EDGE	ZONE 3 - ROOF CENTER	ZONE 4 - WALL INTERIOR	ZONE 5 - WALL EDGE	
10 SF	-58.96	-77.78	-106.0	-36.39	33.87	-45.16 33.87
20 SF	-55.07	-72.78	-96.0	-35.19	32.37	-42.16 32.37
50 SF	-49.93	-66.17	-82.78	-33.21	30.39	-38.19 30.39
100 SF	-46.04	-61.17	-76.78	-31.71	28.89	-35.19 28.89

NOTES:
1. CLADDING PRESSURES ARE CALCULATED PER ASCE 7-16 AND ARE ASD LOADS.
2. CORNER WALL ZONE 5 AND ROOF ZONE 3 DIMENION IS 'a' = 3'-0"

NET UPLIFT AND WALL PRESSURE DIAGRAM

RMA ARCHITECTS & INTERIOR DESIGNERS
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Victoria, Texas 77901
www.rmaarch.com

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
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DATE ISSUED:
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PROJECT NUMBER:
1092-0325

PLAN NORTH / TRUE NORTH

SHEET NAME
PRESS BOX FLOOR AND ROOF FRAMING PLANS

SHEET NUMBER
S1-2

R ENGINEERING M
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T.B.P.E. FIRM NO. 6944
REM PROJECT NO: 25-120

STATE OF TEXAS — ROBERT ENRIQUEZ MARTINEZ — 89387 — LICENSED PROFESSIONAL ENGINEER — 11.11.25
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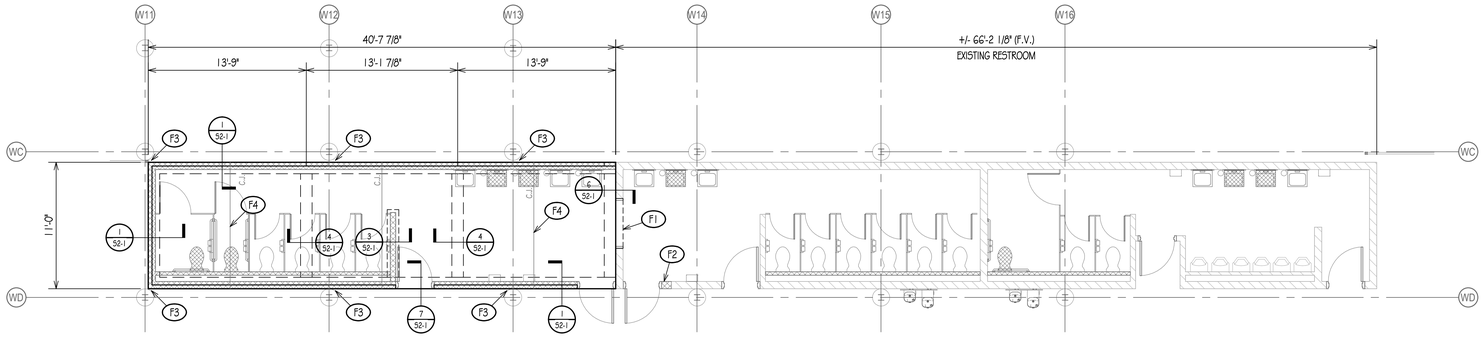
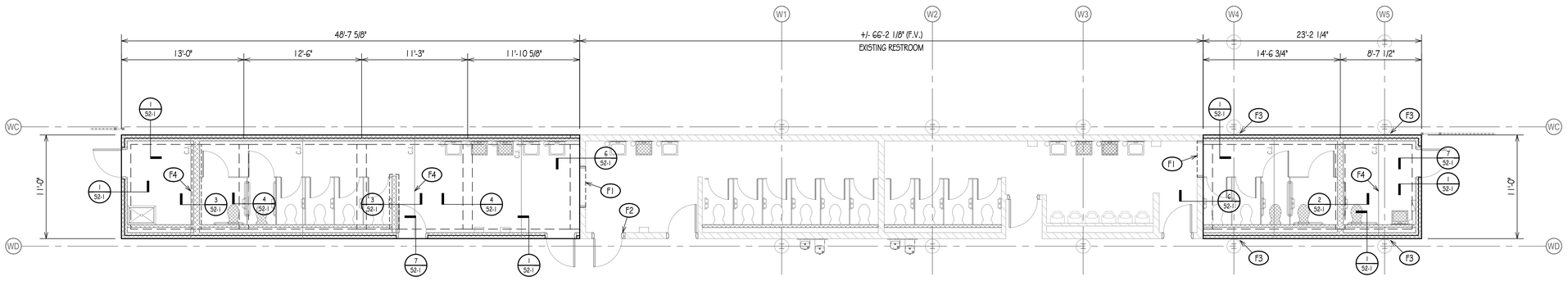


HOME SIDE NW RESTROOM FOUNDATION PLAN

SCALE: 3/16" = 1'-0"

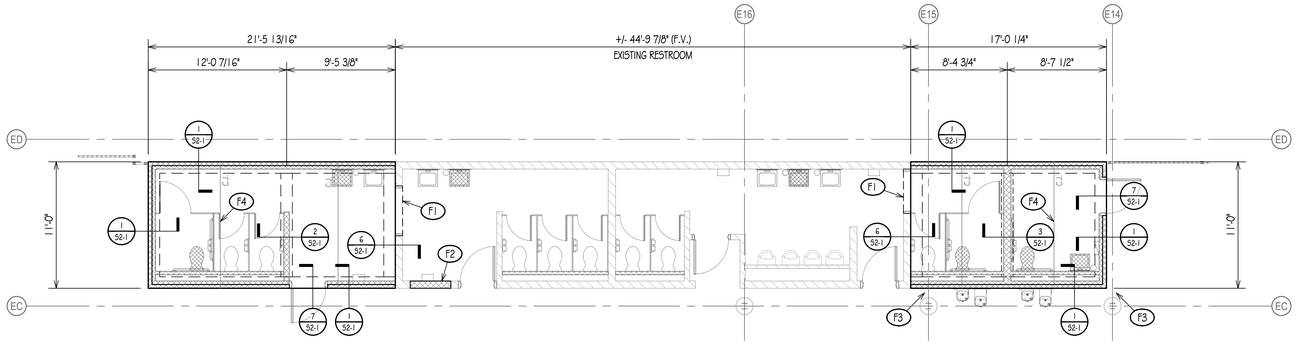
PLAN NORTH
NOT TRUE NORTH



HOME SIDE SW RESTROOM FOUNDATION PLAN

SCALE: 3/16" = 1'-0"

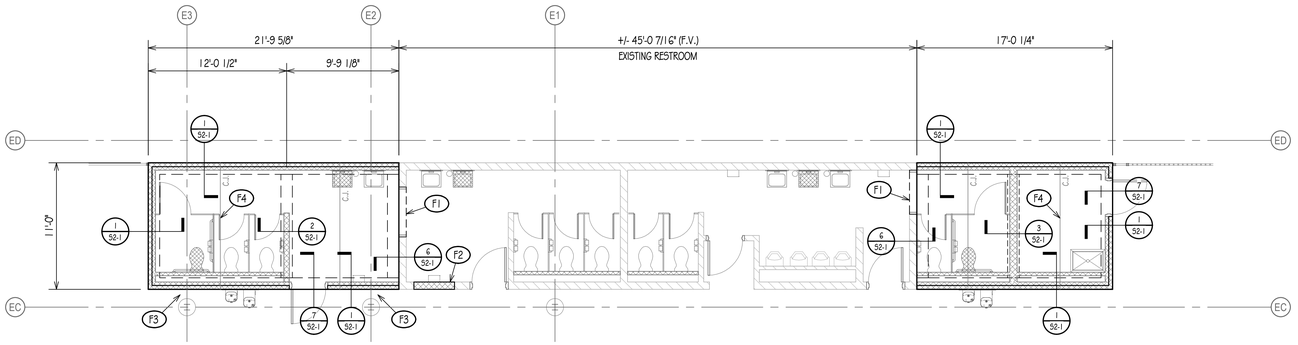
PLAN NORTH
NOT TRUE NORTH



VISITOR SIDE NE RESTROOM FOUNDATION PLAN

SCALE: 3/16" = 1'-0"

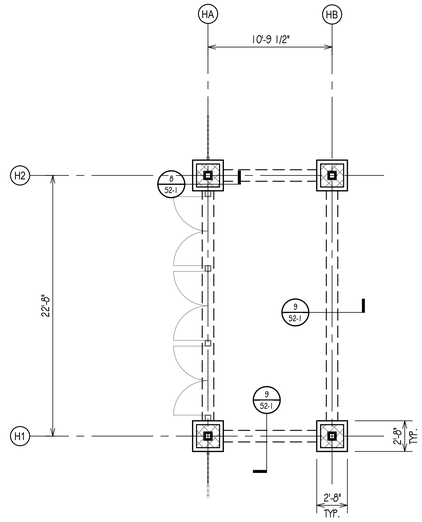
PLAN NORTH
NOT TRUE NORTH



VISITOR SIDE SE RESTROOM FOUNDATION PLAN

SCALE: 3/16" = 1'-0"

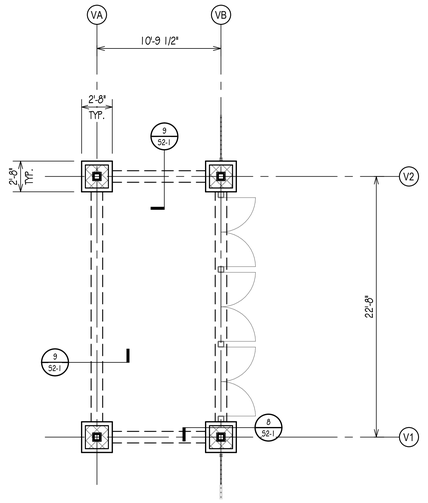
PLAN NORTH
NOT TRUE NORTH



HOME SIDE ENTRANCE FOUNDATION PLAN

SCALE: 3/16" = 1'-0"

PLAN NORTH
NOT TRUE NORTH



VISITOR SIDE ENTRANCE FOUNDATION PLAN

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RESTROOM AND ENTRANCE CANOPY PLAN KEYED NOTES:

F1 NEW OPENING IN EXISTING CMU WALL - SEE DETAIL 5 / S3-1 FOR NEW LINTEL.

F2 NEW CMU WALL INFILL AT EXISTING OPENING - SEE DETAIL 6 / S3-1 FOR ADDITIONAL NOTES.

F3 CONTRACTOR MUST TAKE CARE NOT TO DAMAGE EXISTING PIER AND COLUMN.

F4 SEE DETAIL 5/S2-1 FOR CONTROL JOINT NOTES.

RESTROOM AND ENTRANCE CANOPY FOUNDATION PLAN NOTES:

1. 5" THICK CONCRETE SLAB ON COMPACTED FILL. REINF. SLAB WITH #4 @ 16" CTRS. EACH WAY IN CENTER OF SLAB. COVER PREPARED GRADE WITH 10 MIL POLYETHYLENE SHEETING PRIOR TO PLACING CONCRETE.
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ALL STRUCTURAL STEEL SHALL BE GALVANIZED

RMA ARCHITECTS & INTERIOR DESIGNERS
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Victoria, Texas 77901
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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

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DATE ISSUED:
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PROJECT NUMBER:
1092-0325

PLAN NORTH / TRUE NORTH

SHEET NAME
RESTROOM AND ENTRANCE FOUNDATION PLANS
SHEET NUMBER

S1-3

R ENGINEERING M
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robert@rmengineeringcorp.com
T.B.P.E. FIRM NO. 6944
REM PROJECT NO: 25-120

STATE OF TEXAS
ROBERT ENRIQUEZ MARTINEZ
89387
LICENSED
PROFESSIONAL ENGINEER
11.11.25
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ROBERT E. MARTINEZ, P.E. # 89387
T.B.P.E. FIRM NO. 6944

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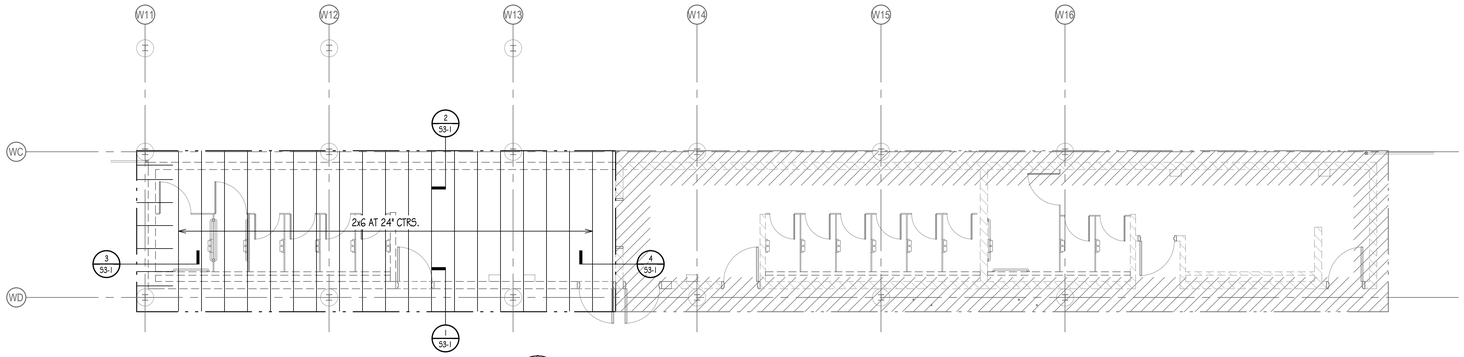
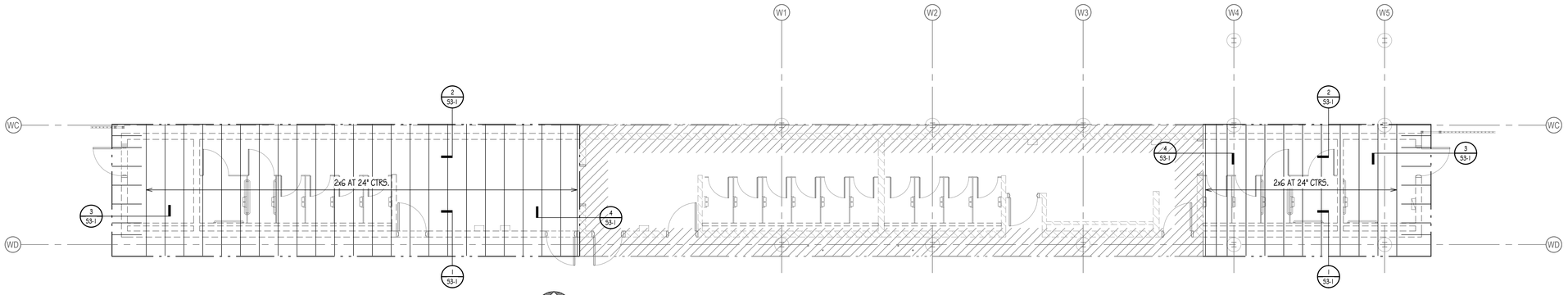


HOME SIDE NW RESTROOM ROOF FRAMING PLAN
SCALE: 3/16" = 1'-0"

PLAN NORTH
NOT TRUE NORTH



HOME SIDE SW RESTROOM ROOF FRAMING PLAN
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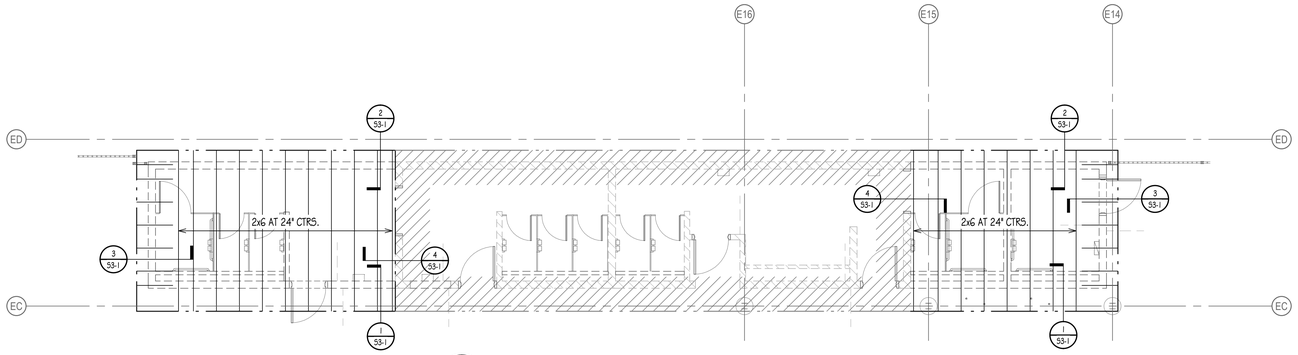
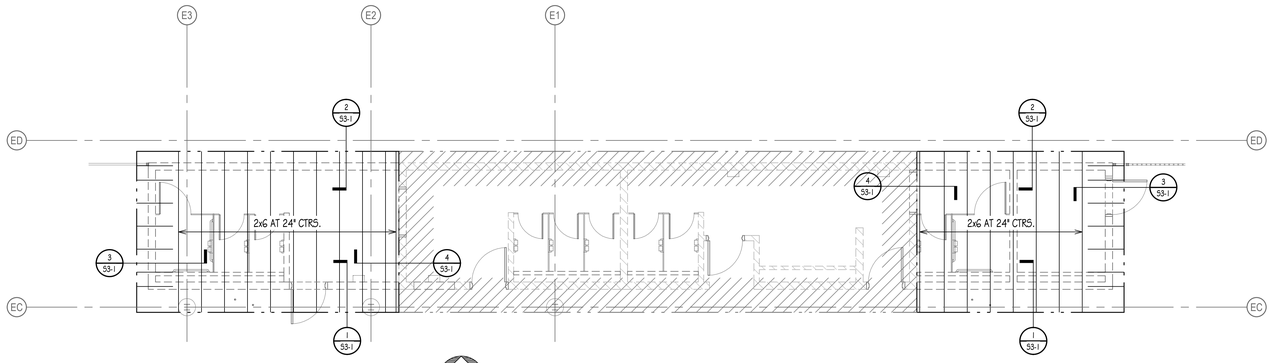


VISITOR SIDE NE RESTROOM ROOF FRAMING PLAN
SCALE: 3/16" = 1'-0"

PLAN NORTH
NOT TRUE NORTH



VISITOR SIDE SE RESTROOM ROOF FRAMING PLAN
SCALE: 3/16" = 1'-0"

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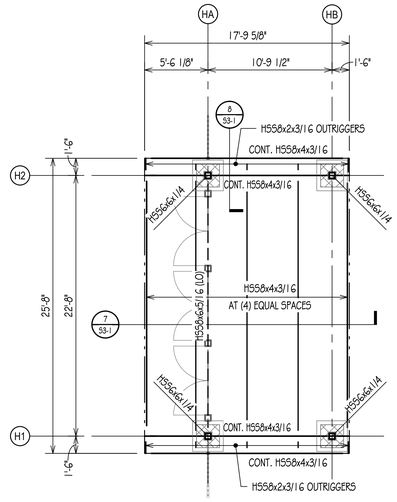
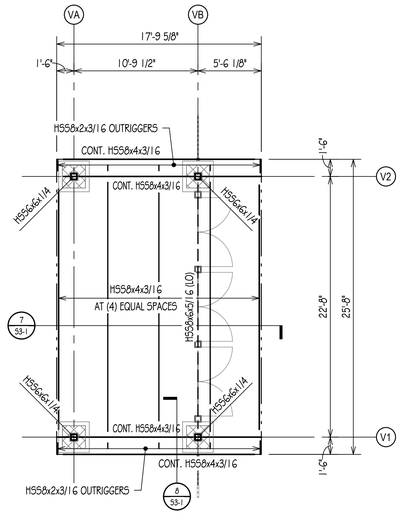


HOME SIDE ENTRANCE ROOF FRAMING PLAN
SCALE: 3/16" = 1'-0"

PLAN NORTH
NOT TRUE NORTH



VISITOR SIDE ENTRANCE ROOF FRAMING PLAN
SCALE: 3/16" = 1'-0"

PLAN NORTH
NOT TRUE NORTH

ALL STRUCTURAL STEEL SHALL BE GALVANIZED

STATE OF TEXAS
ROBERT ENRIQUEZ MARTINEZ
89387
REGISTERED PROFESSIONAL ENGINEER
11-11-25

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PROJECT NUMBER:
1092-0325

PLAN NORTH ⊕ TRUE NORTH ⊗

SHEET NAME
RESTROOM AND ENTRANCE ROOF FRAMING PLANS

SHEET NUMBER
S1-4

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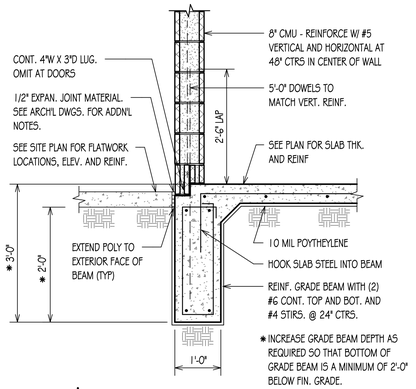
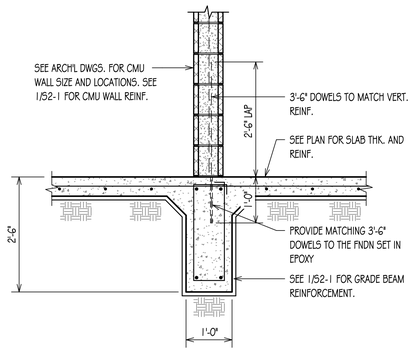
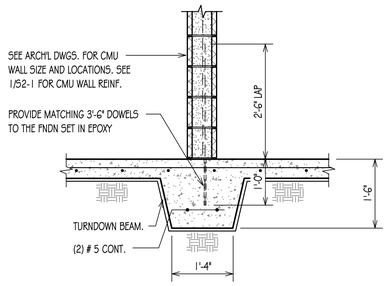


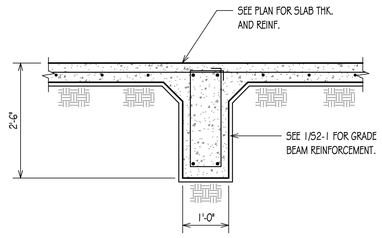
1 PERIMETER DETAIL AT RESTROOMS



2 TYPICAL INTERIOR GRADE BEAM DETAIL AT RESTROOMS



3 TYPICAL SLAB TURNDOWN DETAIL AT CMU WALL AT RESTROOMS



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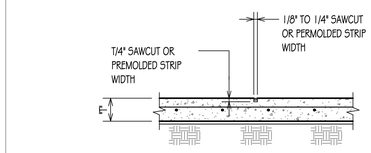


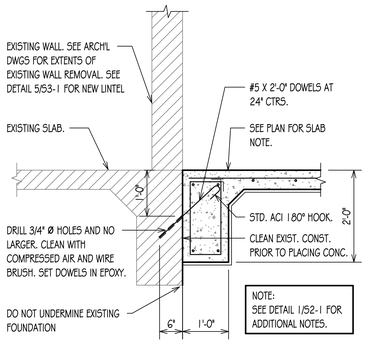
SAW CONTROL JOINT NOTES

1. MAKE SAWCUT AS SOON AS SLAB IS ABLE TO SUPPORT WEIGHT OF WORKERS AND SAWING EQUIPMENT WITHOUT DAMAGE TO FINISH SURFACE OF SLAB.
2. CLEAN JOINT PRIOR TO FILLING THE JOINT.

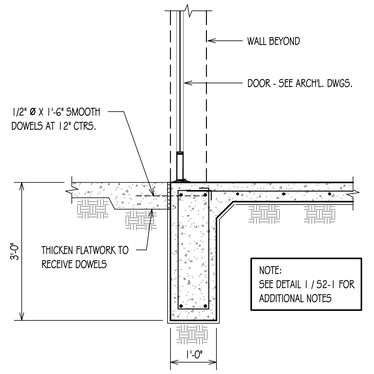
JOINT FILLER MATERIAL NOTES

1. FILLER MATERIAL USED SHALL HAVE A MINIMUM, HARDNESS OF 35, AND SHALL CONFORM TO ASTM D2240. JOINT FILLER SHALL BE APPROVED BY ENGINEER PRIOR TO APPLICATION.
2. WHERE POSSIBLE, FILLER MATERIAL SHALL BE APPLIED WHEN BUILDING IS UNDER PERMANENT TEMPERATURE CONTROL. THIS SHALL BE EITHER AT THE END OF CONSTRUCTION OF THE COMPLETE BUILDING SHELL, OR A MINIMUM OF 90 DAYS AFTER SLAB CONSTRUCTION.
3. FOLLOW STRICTLY THE MANUFACTURERS RECOMMENDED PROCEDURES FOR APPLYING THE JOINT FILLER.

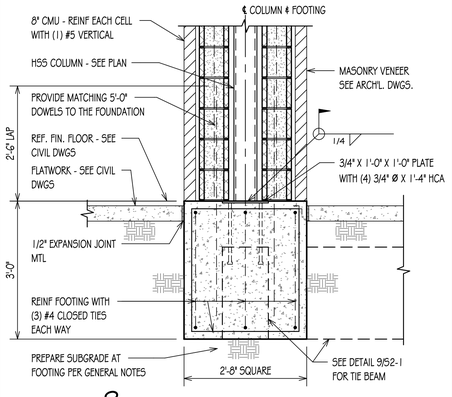
5 TYPICAL SAWED SLAB CONTROL JOINT DETAIL AT SLAB-ON-GRADE FOUNDATIONS



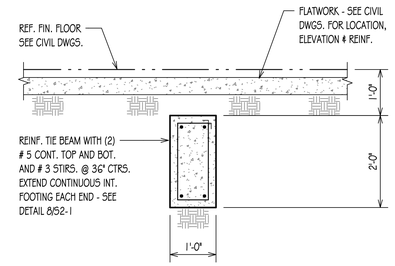
6 TYPICAL DETAIL AT RESTROOM EXISTING CONTRUCTION



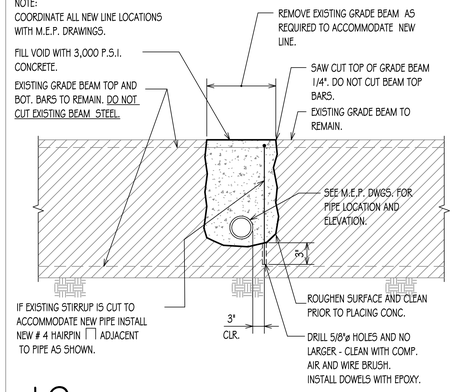
7 TYPICAL PERIMETER GRADE BEAM DETAIL AT BATHROOM DOOR



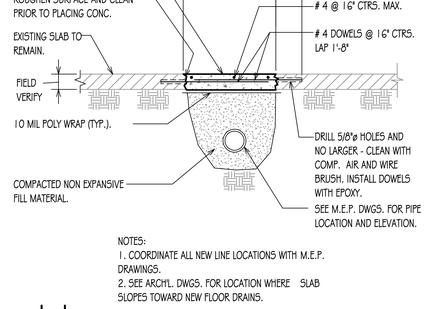
8 TYPICAL FOOTING DETAIL AT ENTRY



9 TYPICAL TIE BEAM DETAIL

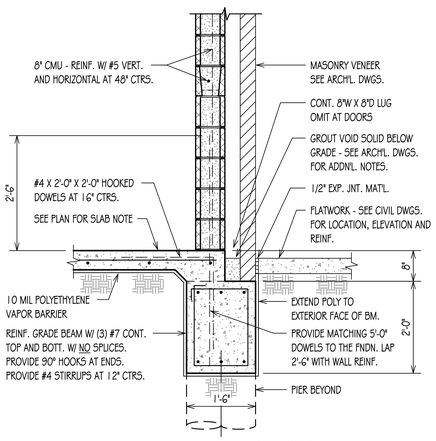


10 TYPICAL GRADE BEAM CUT OUT DETAIL AT NEW PIPE



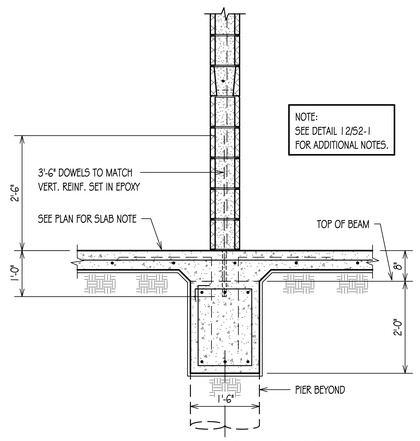
NOTES:
1. COORDINATE ALL NEW LINE LOCATIONS WITH M.E.P. DRAWINGS.
2. SEE ARCH'L. DWGS. FOR LOCATION WHERE SLAB SLOPES TOWARD NEW FLOOR DRAINS.

11 TYPICAL SLAB CUT OUT DETAIL AT NEW PIPE



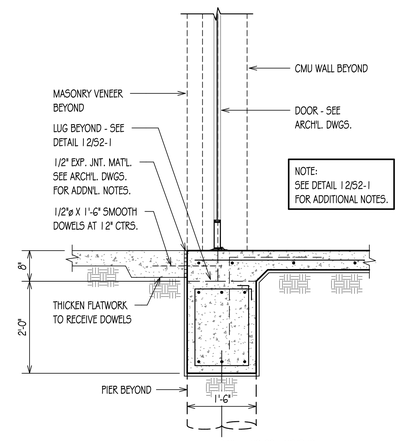
℄ BM. AND PIER BEYOND

12 TYPICAL PERIMETER BEAM DETAIL AT ELEVATOR



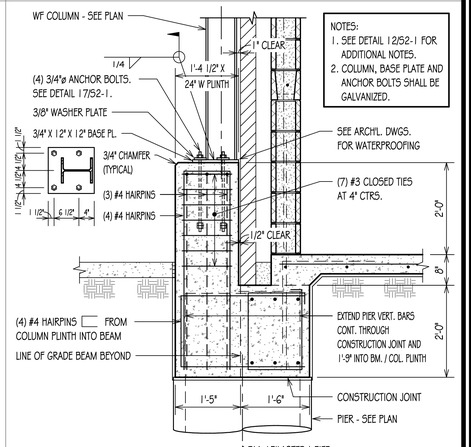
℄ CMU WALL, BM. AND PIER BEYOND

13 TYPICAL INTERIOR GRADE BEAM DETAIL AT ELEVATOR



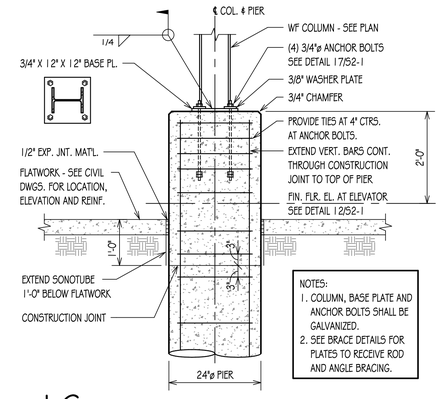
℄ BM. AND COL. BEYOND

14 TYPICAL PERIMETER BEAM DETAIL AT ELEVATOR



℄ BM. / PILASTER ∜ PIER

15 TYPICAL DETAIL AT COLUMN ADJACENT TO ELEVATOR



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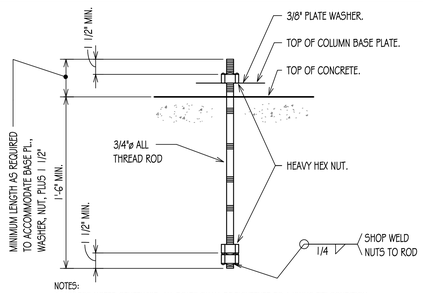

NOTES:
1. UNLESS NOTED OTHERWISE, ALL BOLTS SHALL BE TIGHTENED TO A "SNUG FIT" CONDITION AS DEFINED BY A.I.S.C. AFTER THE CONCRETE IS AT LEAST 14 DAYS OLD.
2. THE HOLE IN THE PLATE WASHER SHALL BE 1/16" LARGER THAN THE BOLT DIAM.

17 TYPICAL ANCHOR BOLT DETAIL

RMA ARCHITECTS & INTERIOR DESIGNERS
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Victoria, Texas 77901
www.rmaarch.com

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 Wildcat Dr., Corpus Christi, TX 78410

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DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

PLAN NORTH / TRUE NORTH

SHEET NAME
FOUNDATION DETAILS

SHEET NUMBER
S2-1

STATE OF TEXAS
ROBERT ENRIQUEZ MARTINEZ
89387
LICENSED PROFESSIONAL ENGINEER
11-11-25
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ROBERT E. MARTINEZ, P.E. # 89387 T.B.P.E. FIRM NO. 6944

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REM PROJECT NO: 25-120

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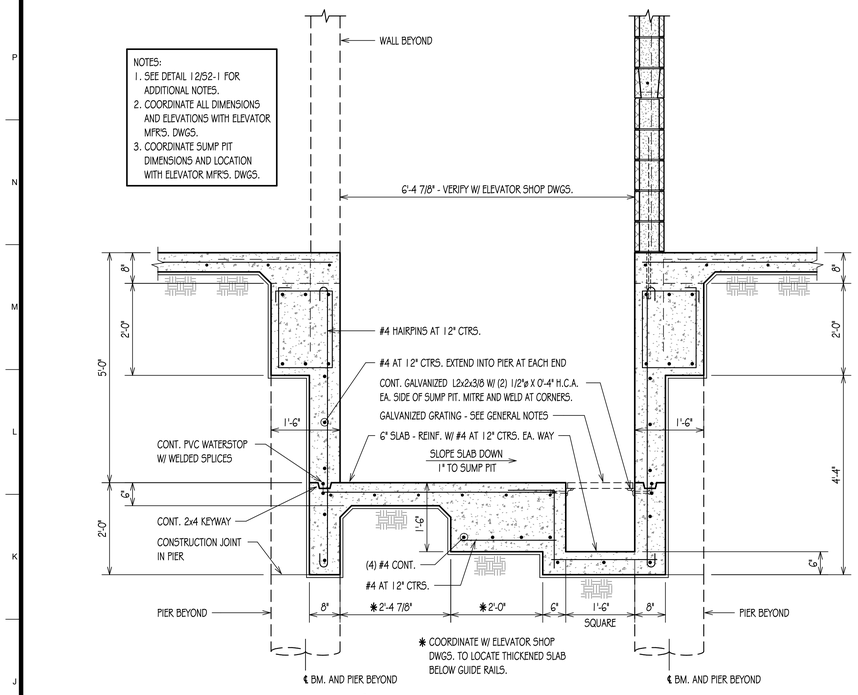

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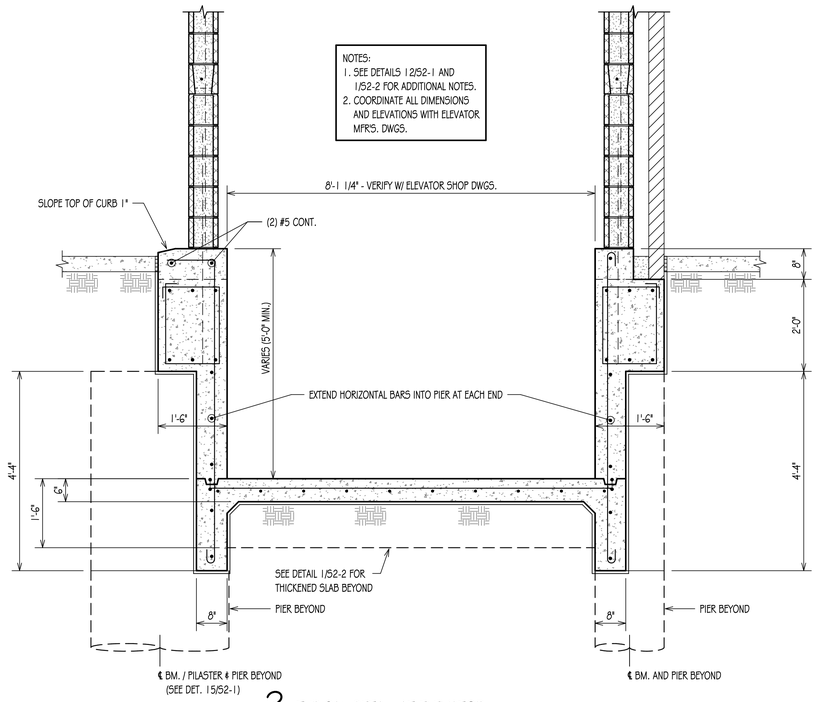

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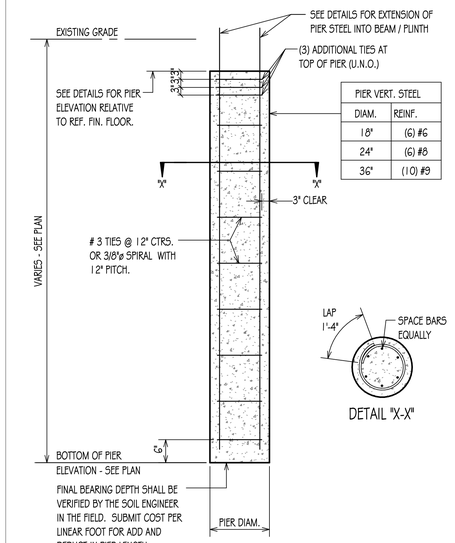
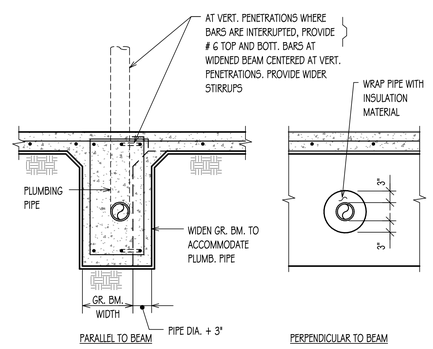
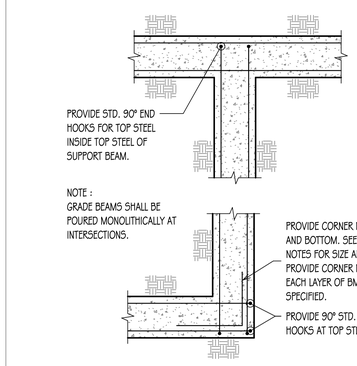


NOTES:
1. REFERENCE GENERAL NOTES FOR ADDITIONAL FOOTING (DRILLED PIER) REQUIREMENTS.
2. PIER HOLES SHALL BE TEMPORARILY CASED AS REQUIRED IF GROUND WATER IS ENCOUNTERED OR IF SLOUGHING OF SHAFT WALLS OCCURS. THE CONTRACTOR SHALL SPECIFY A UNIT COST FOR DIFFERENT LENGTHS OF CASING WHEN BIDDING THE JOB.

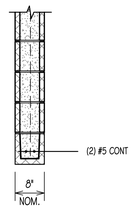
3 TYPICAL DRILLED PIER DETAIL



4 TYPICAL PIPE PENETRATION THROUGH GRADE BEAM DETAIL

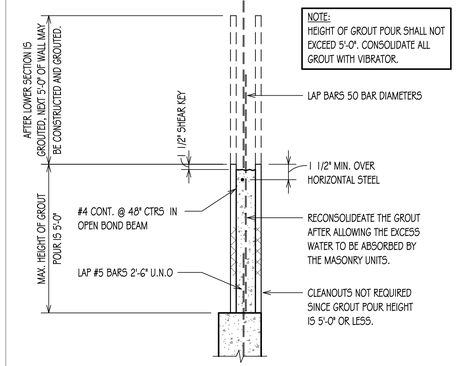


5 TYPICAL DETAIL GRAD BEAM REINF. STEEL (PLAN VIEW)

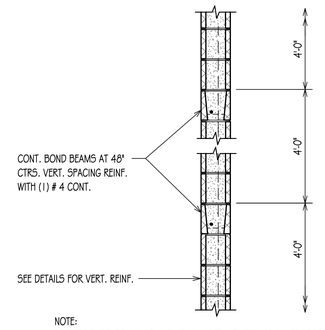


NOTES:
1. SEE ARCHITECTURAL DRAWINGS FOR SIZE AND LOCATION OF OPENINGS. PROVIDE 1" OF BEARING AT EACH JAMB FOR EACH FOOT OF CLEAR SPAN BUT NOT LESS THAN 7 5/8".
2. REINFORCEMENT SHALL PROJECT A MINIMUM OF 6" ONTO THE BEARING.
3. MINIMUM MASONRY COMPRESSIVE STRENGTH OF GROUTED PRISM f'm=1500 p.s.i.

6 TYPICAL LOAD BEARING CMU LINTEL SCHEDULE

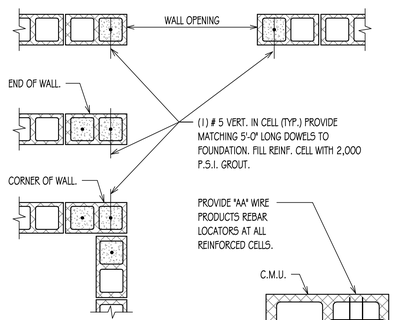


7 TYPICAL LOW LIFT METHOD OF GROUTING BLOCK DETAIL

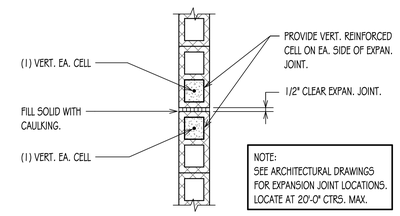


NOTE:
PROVIDE BOND BEAMS AT 4'-0" CTRS. VERT. SPACING AT ALL REINFORCED CMU WALLS FOR FULL HEIGHT OF WALL.

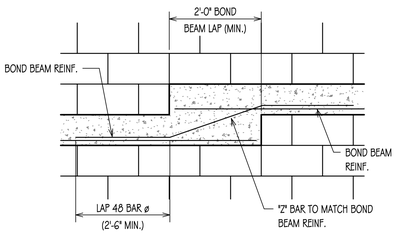
8 TYPICAL HORIZONTAL BOND BEAM DETAIL AT ALL REINFORCED CMU WALLS



9 TYPICAL CMU WALLS REINF. DETAIL



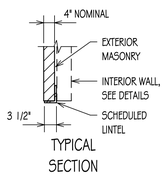
10 TYPICAL EXPANSON JOINT DETAIL



11 TYPICAL CMU BOND BEAM STEP DETAIL

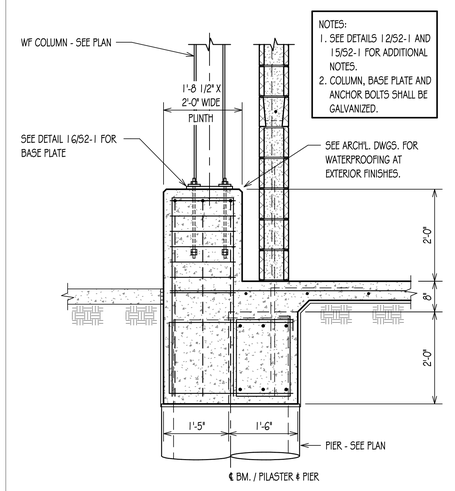
CLEAR OPNG.	MINIMUM ANGLE SIZE
✱6'-0"	(1) L 3 1/2" X 3 1/2" X 5/16"
6'-8"	(1) L 4" X 3 1/2" X 5/16"
7'-4"	(1) L 5" X 3 1/2" X 5/16"
8'-0"	(1) L 6" X 3 1/2" X 5/16"
10'-0"	(1) L 7" X 4" X 7/16"
12'-0"	(1) L 9" X 4" X 1/2"

✱USE FOR ALL CLEAR OPENINGS LESS THAN 6'-0".



NOTES:
1. SEE ARCHITECTURAL DRAWINGS FOR SIZE AND LOCATION OF OPENINGS.
2. PROVIDE 1" OF BEARING AT EACH JAMB FOR EACH FOOT OF CLEAR SPAN BUT NOT LESS THAN 6".
3. WHERE MINIMUM BEARING CANNOT BE ACHIEVED, PROVIDE ADEQUATE CONNECTION TO ADJACENT STRUCTURAL MEMBERS OR PROVIDE SEPARATE VERTICAL SUPPORTS. SUBMIT SUCH DETAILS FOR THE ENGINEER'S APPROVAL.
4. ALL LINTELS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.
5. FOR MASONRY OPENINGS GREATER THAN 12'-0", SEE DETAILS ON THE DRAWINGS OR REFER TO ENGINEER.
6. BRICK HEIGHTS OVER OPENINGS GREATER THAN ONE HALF THE LINTEL SPAN SHALL BE SHORED UNTIL MORTAR HAS SET AND CURED.

12 NON-LOAD BEARING STEEL LOOSE LINTEL SCHEUDLE EXTERIOR MASONRY



13 COLUMN DETAIL ADJACENT TO ELEVATOR AT GRID 8

RMA ARCHITECTS & INTERIOR DESIGNERS
311 E. Constitution St., Ste 210
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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

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PLAN NORTH ⊗ TRUE NORTH

SHEET NAME
FOUNDATION DETAILS

SHEET NUMBER
S2-2

STATE OF TEXAS
ROBERT ENRIQUEZ MARTINEZ
89387
LICENSED PROFESSIONAL ENGINEER
Robert E. Martinez
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REM PROJECT NO: 25-120

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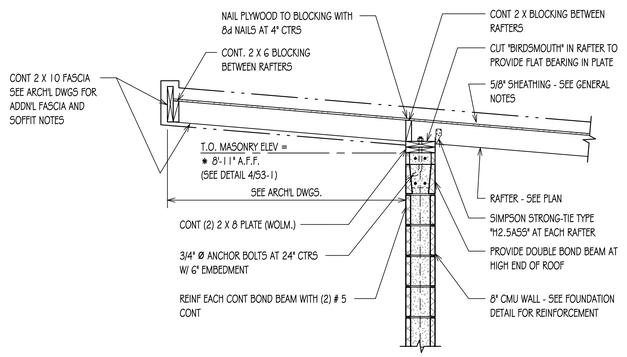

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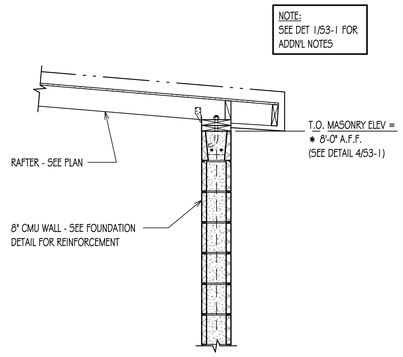

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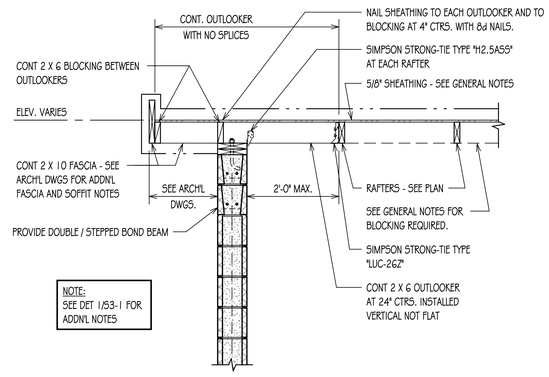

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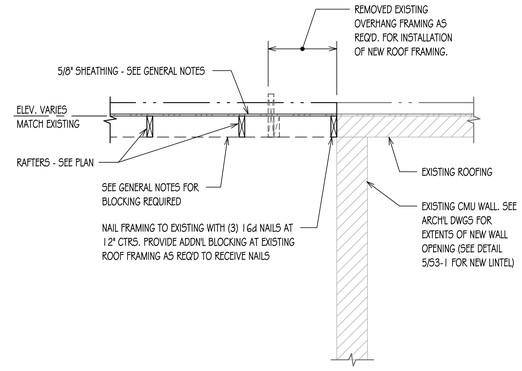

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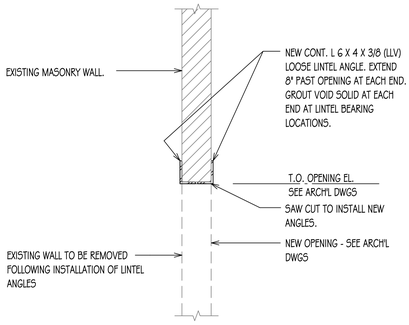
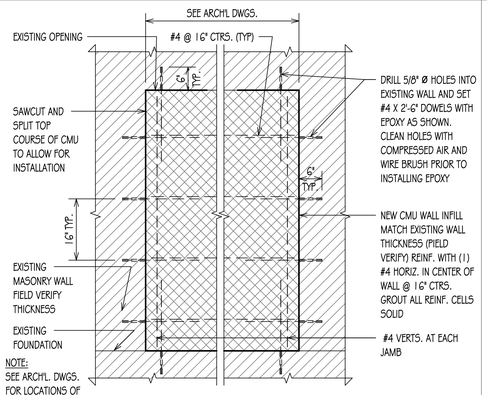


5 TYPICAL LINTEL DETAIL AT EXISTING WALL



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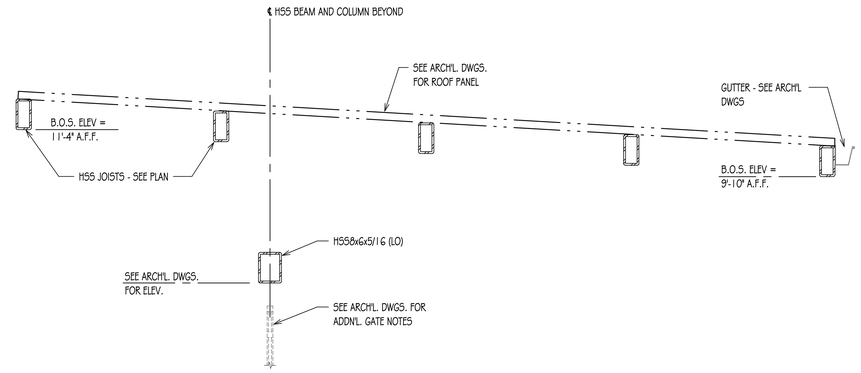

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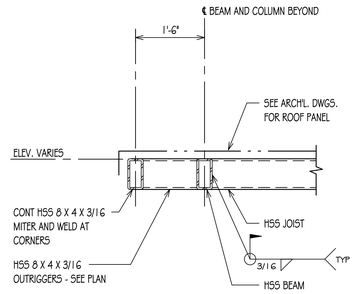

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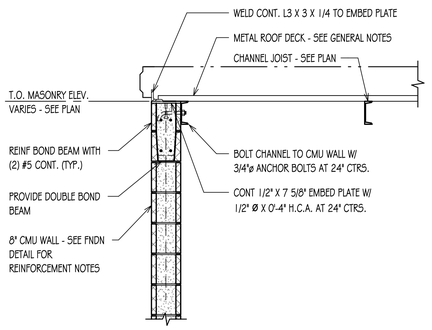
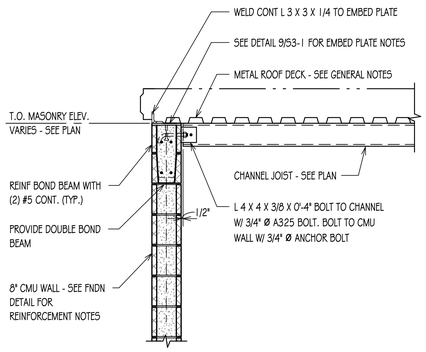


9 TYPICAL DETAIL AT ROOF



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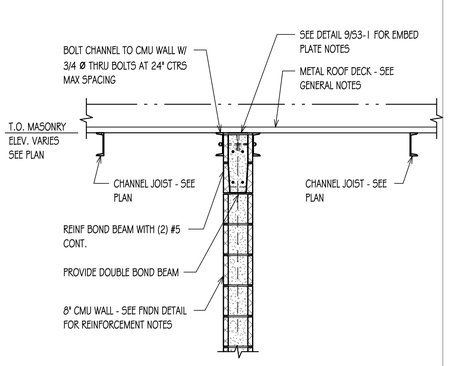

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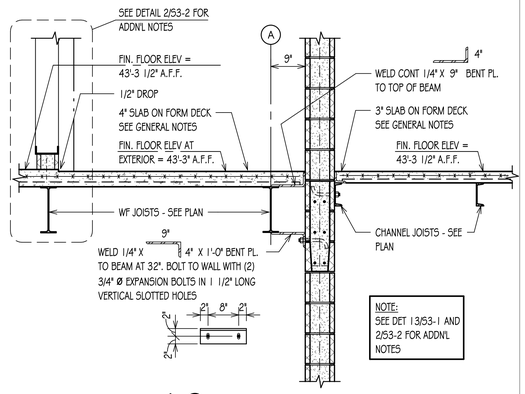

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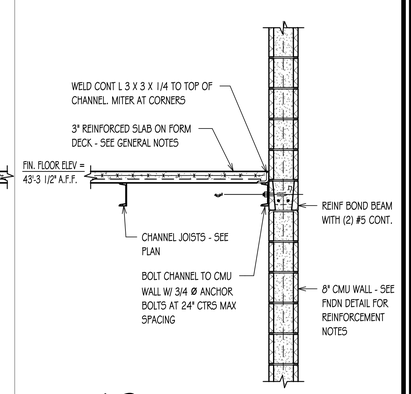

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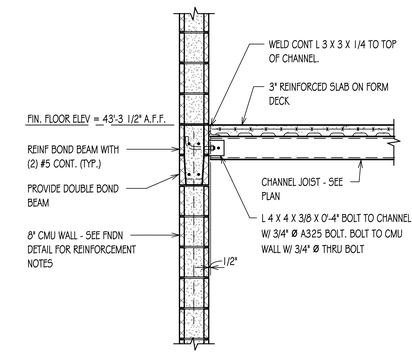
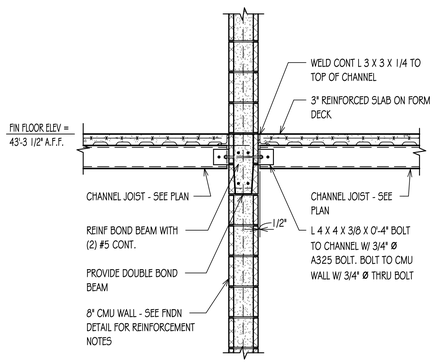


14 TYPICAL DETAIL AT ROOF



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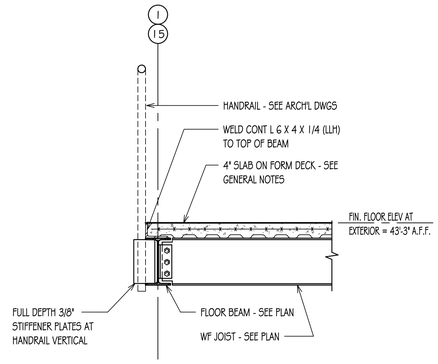

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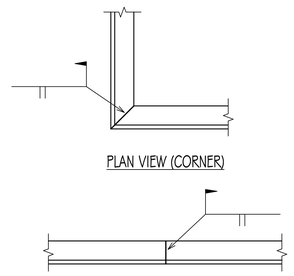

PLAN VIEW (CORNER)

PLAN VIEW (TYPICAL)

NOTE:
THIS DETAIL APPLIES TO ALL DECK EDGE ANGLES ON THE ENTIRE PROJECT.

17 DECK DIAPHRAGM CHORD ANGLE SPLICE DETAIL

ROOF DECK SHALL BE ATTACHED AS FOLLOWS :

SUPPORTS = #12 WITH 5/8"ø INTEGRAL WASHER SIMPSON STRONG-TIE QUICK DRIVE XLQ-SERIES SCREWS (XLQ114T1224 OR XLQ114BI224 ON A 36 / 7 PATTERN)

SIDELAPS = CONNECT ADJACENT SHEETS WITH #10 SST QUICK-DRIVE X-SERIES SCREWS AT THE SIDELAPS SPACED AT 6" CTRS.

ROOF DECK NOTES:
1. ALL FASTENERS SHALL BE INSPECTED BY THE TESTING LAB.
2. LAP DECK 3" MIN. AT ENDS.

18 TYPICAL ROOF DECK CONNECTION DETAIL

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REM PROJECT NO: 25-120

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 Wildcat Dr., Corpus Christi, TX 78410

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DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

PLAN NORTH / TRUE NORTH

SHEET NAME
FRAMING DETAILS

SHEET NUMBER
S3-1

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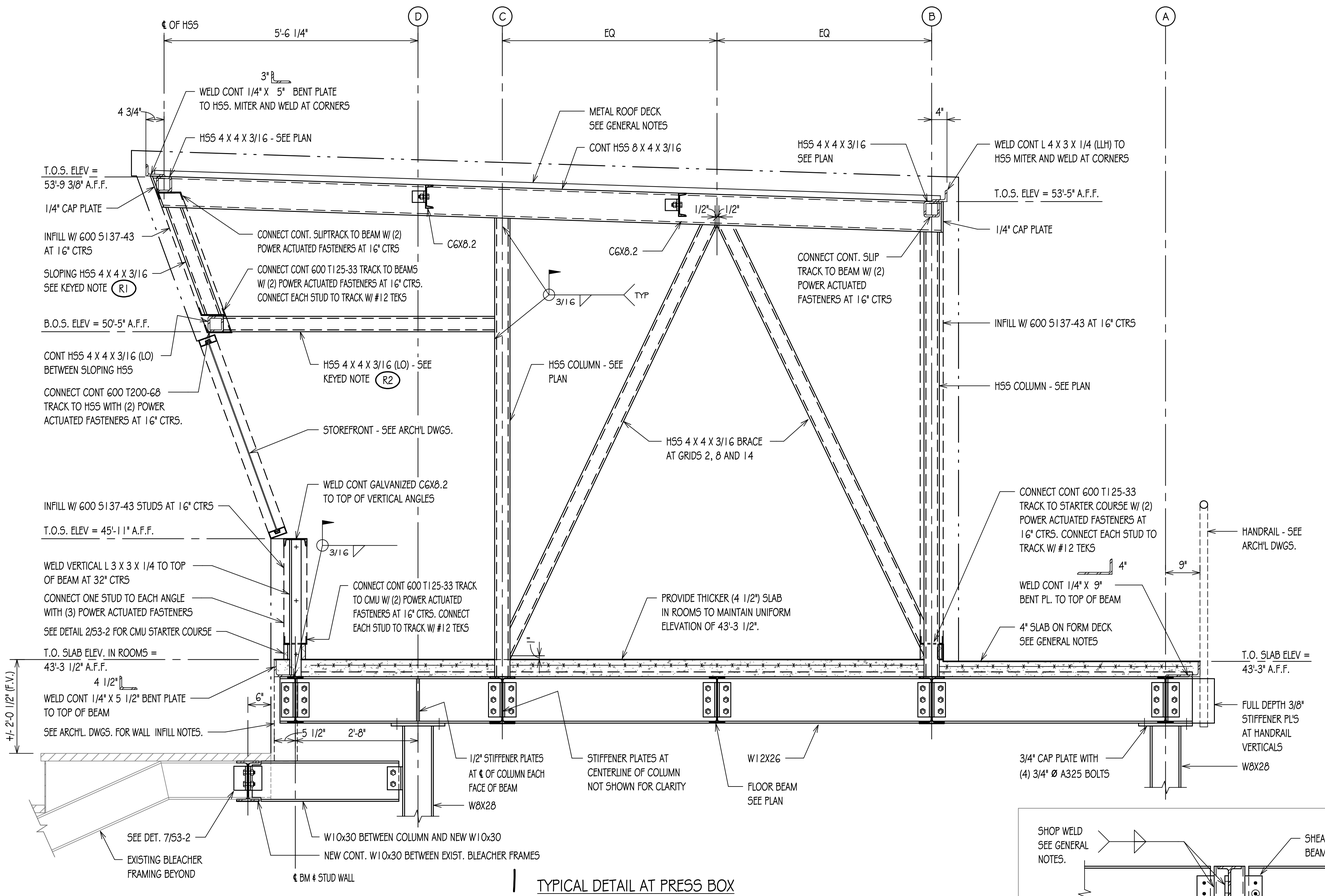

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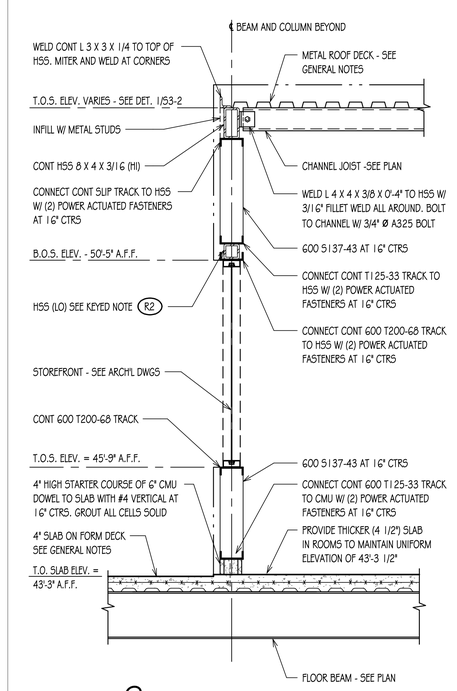

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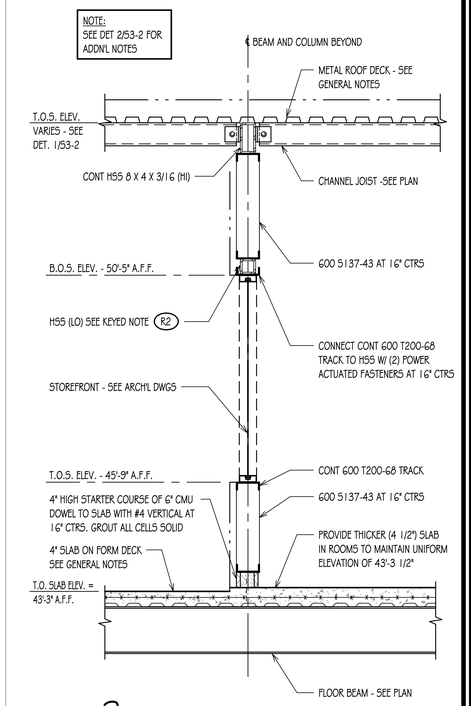

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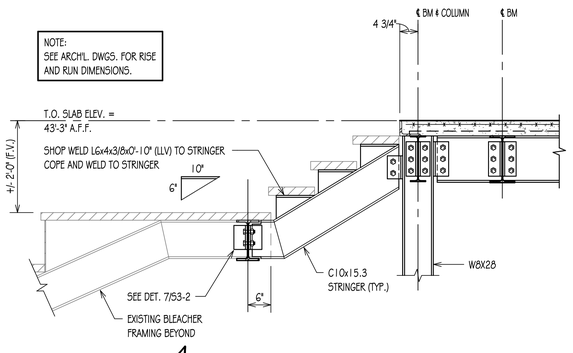

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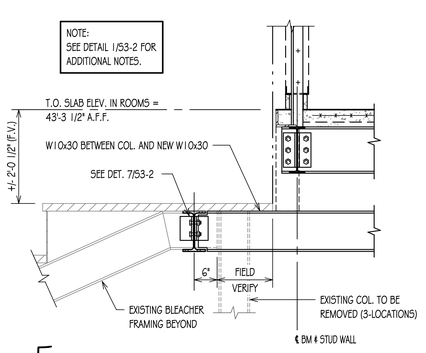
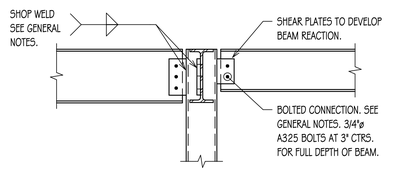
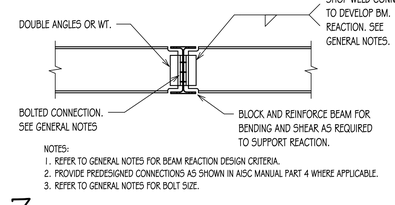


5 PRESS BOX DETAIL AT EXIST. COL. TO BE REMOVED

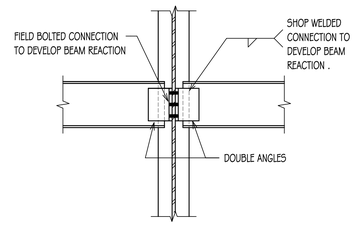


6 TYPICAL DETAIL STEEL WIDE FLANGE BEAM CONNECTION TO TUBE COLUMNS



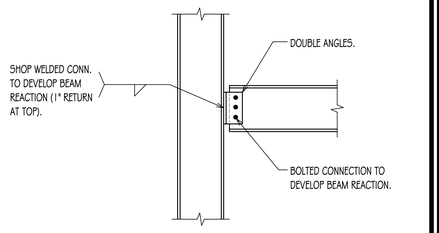
NOTES:
1. REFER TO GENERAL NOTES FOR BEAM REACTION DESIGN CRITERIA.
2. PROVIDE PREDESIGNED CONNECTIONS AS SHOWN IN AISC MANUAL PART 4 WHERE APPLICABLE.
3. REFER TO GENERAL NOTES FOR BOLT SIZE.

7 TYP. DET. BEAM DOUBLE ANGLE SHEAR CONNECTION



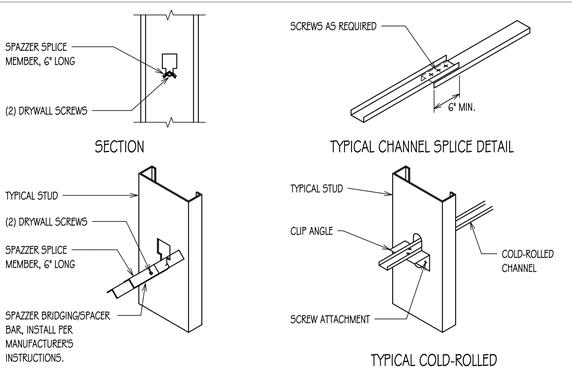
NOTES:
1. REFER TO GENERAL NOTES FOR BEAM REACTION DESIGN CRITERIA.
2. PROVIDE PRE-DESIGNED CONNECTIONS AS SHOWN IN AISC MANUAL WHERE APPLICABLE.
3. REFER TO GENERAL NOTES FOR BOLT TYPE.

8 TYPICAL DETAIL STEEL BEAM TO COLUMN WEB DOUBLE ANGLE SHEAR CONNECTION



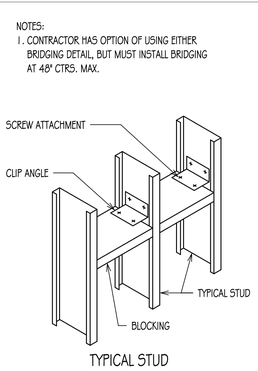
NOTES:
1. REFER TO GENERAL NOTES FOR BEAM REACTION DESIGN CRITERIA.
2. PROVIDE PRE-DESIGNED CONNECTIONS AS SHOWN IN A.I.S.C. MANUAL WHERE APPLICABLE.
3. REFER TO GENERAL NOTES FOR BOLT TYPE.
4. DOUBLE ANGLES MAY BE SHOP WELDED TO THE BEAM AND FIELD BOLTED TO THE COLUMN AT CONTRACTOR'S OPTION.

9 TYPICAL DETAIL STEEL BEAM TO COLUMN FLANGE DOUBLE ANGLE SHEAR CONNECTION



TYPICAL "SPAZZER" BRIDGING DETAIL

TYPICAL COLD-ROLLED CHANNEL BRIDGING DETAIL



TYPICAL STUD BLOCKING BRIDGING DETAIL

10 TYPICAL STUD WALL BRIDGING DETAILS

ALL STUDS AND JOISTS HAVE A FOUR PART IDENTIFICATION CODE WHICH IDENTIFIES THE SIZE (BOTH DEPTH AND FLANGE WIDTH), STYLE AND MATERIAL THICKNESS OF EACH MEMBER

EXAMPLES:

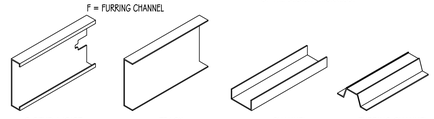
MEMBER DEPTH:
(EXAMPLE: 6" = 600 X 1/100 INCHES)
ALL MEMBER DEPTHS ARE TAKEN IN 1/100 INCHES. FOR ALL "T" SECTIONS MEMBER DEPTH IS THE INSIDE DIMENSION.

MEMBER DEPTH:
(EXAMPLE: 1 3/8" = 1.375" 1/37 X 1/100 INCHES)
ALL FLANGE WIDTHS ARE TAKEN IN 1/100 INCHES.

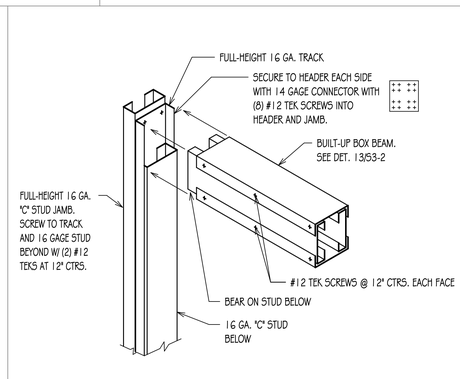
600 S 137 – 43

STYLE:
(EXAMPLE: STUD OR JOIST SECTION = S)
THE FOUR ALPHA CHARACTERS UTILIZED BY THE DESIGNATOR SYSTEM ARE:
S = STUD OR JOIST SECTIONS
T = TRACK SECTIONS
U = CHANNEL SECTIONS
F = FURRING CHANNEL

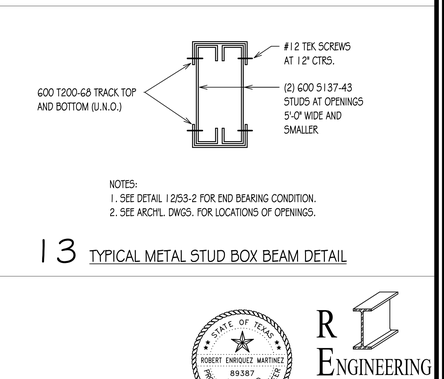
MATERIAL THICKNESS:
(EXAMPLE: 0.043 in. = 43 mils.
1 mil. = 1/100 in.)
MATERIAL THICKNESS IS THE MINIMUM BASE METAL THICKNESS IN mils. MINIMUM BASE METAL THICKNESS REPRESENTS 95% OF THE DESIGN THICKNESS.



11 LIGHTGAGE METAL STUD AND JOIST IDENTIFICATION



12 TYPICAL BOX BEAM BEARING DETAIL



NOTES:
1. SEE DETAIL 12/S3-2 FOR END BEARING CONDITION.
2. SEE ARCH'L. DWGS. FOR LOCATIONS OF OPENINGS.

13 TYPICAL METAL STUD BOX BEAM DETAIL

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
CALALLEN INDEPENDENT SCHOOL DISTRICT
4001 Wildcat Dr., Corpus Christi, TX 78410

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DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

PLAN NORTH / TRUE NORTH

SHEET NAME
FRAMING DETAILS

SHEET NUMBER
S3-2

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REM PROJECT NO: 25-120

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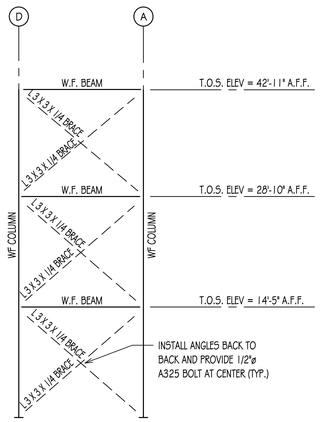
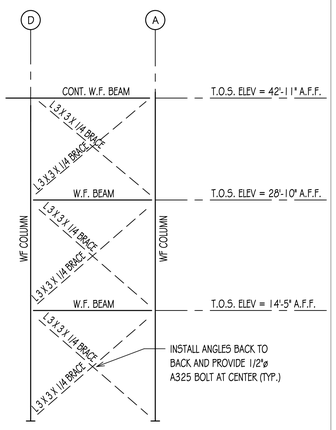
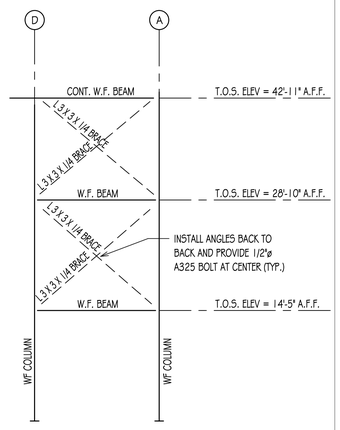


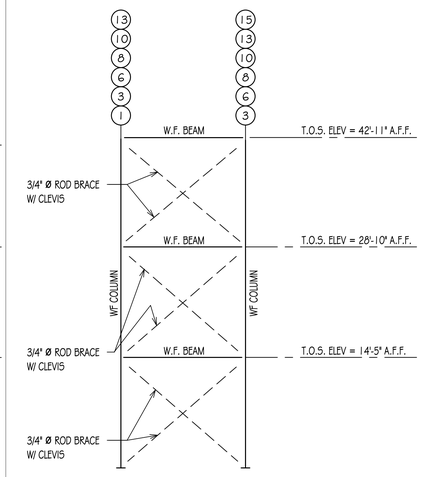
1 BRACE ELEVATION GRID 1 & 15



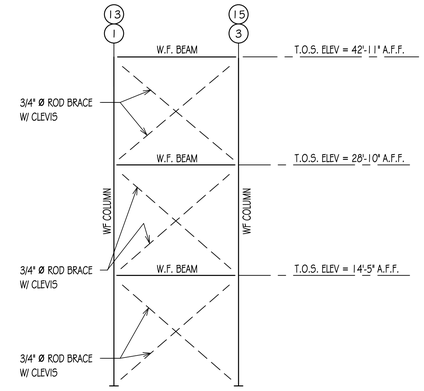
2 BRACE ELEVATION GRID 3 & 13



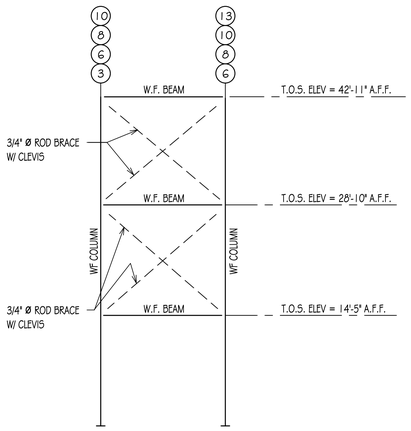
3 BRACE ELEVATION GRID 6, 8 & 10



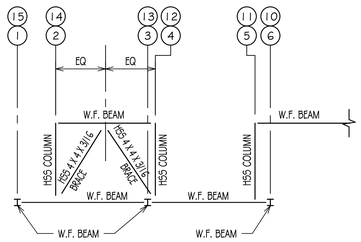
4 BRACE ELEVATION GRID D



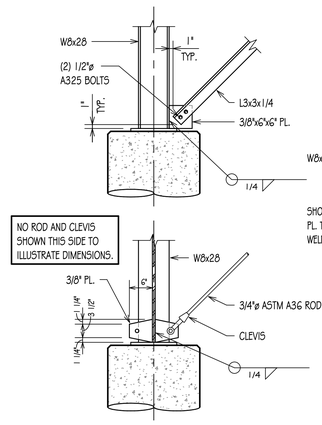
5 BRACE ELEVATION GRID A



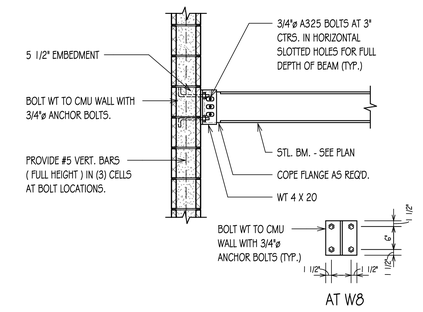
6 BRACE ELEVATION GRID A



7 BRACE ELEVATION GRID B (TWO LOCATIONS)



8 TYPICAL BRACE DETAILS



9 TYPICAL STEEL BEAM TO
CMU WALL CONNECTION DETAIL

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& INTERIOR DESIGNERS
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SHEET NUMBER
S3-3

STATE OF TEXAS
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11-25
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GENERAL NOTES

GENERAL

GC-1 The contract structural documents represent the finished structure, and, except where specifically shown, do not indicate the method or means of construction. The Contractor shall supervise and direct the work and shall be solely responsible for all construction means, methods, procedures, techniques, and sequence.

GC-2 The structure has been designed to resist design loads only as a completed structure. Applications of construction loads to the partially completed structure shall be considered by the Contractor and so included in the design of shoring, bracing, formwork, and any other supporting elements provided for construction of the structure. During erection and until all permanent connections are made, the Contractor must provide temporary bracing to brace the structure in all directions.

GC-3 The Engineer shall not have control or charge of, and shall not be responsible for, construction means, methods techniques, sequences, or procedures for safety precautions and programs in connection with the work, for the acts or omission of the Contractor, Subcontractor, or any other persons performing any of the work, or for the failure of any of them to carry out the work in accordance with the contract documents.

GC-4 General Contractor shall check and verify all dimensions, grade conditions, (both new and existing) reporting any discrepancies to the Engineer before proceeding with any phase of the work as the Contractor will be responsible for all work fitting as intended by the construction documents.

GC-5 Contractor must field verify all existing dimensions, elevations and conditions prior to starting work. Contractor must expose all existing conditions as required to verify that conditions match what are shown on the structural drawings. Conditions that deviate from those shown on the drawings must be brought to the immediate attention of the Architect and Engineer. Details shown on the contract documents are subject to change pending final field verification by the Contractor. The Contractor is responsible for verifying the existing conditions as early as possible in the job prior to ordering or purchasing any materials.

STRUCTURAL DESIGN CRITERIA

SD-1 A. Live loads:
1. Roof - 20 PSF (Reduced in accordance with IBC 1607.13.2.1)
2. Public Areas - 100 PSF (Non-Reduceable)
3. Mechanical Rooms - 125 PSF (Non-Reduceable)
4. Storage Rooms - 125 PSF (Non-Reduceable)
5. Combinations in accordance with IBC 1605.3.1

B. Wind loads - ASCE 7-16 (IBC 1609.1)

Ultimate Design Wind Speed (MPH)	147 (Vult)
Exposure classification	C
Risk Category	III (IBC Table 1604.5)

C. Ground Snow Load 0 PSF

D. Seismic Design Category A

SD-2 Future Loads: Unless specifically noted, there are no provisions made for future floors, roofs, or other loads.

SD-3 Applicable codes:
A. 2021 International Building Code
B. ASCE 7-16
C. ACI 318-14
D. AISC Fourteenth Edition 2011
E. AWS D1.1

GEOTECHNICAL REPORT

GR-1 Foundation design is based on the geotechnical investigation report by Intertek-PSI Dated July 11, 2025. (PSI Project No. 0312-3551)

GR-2 The soil report is available to the General Contractor upon request to the Architect. The information included therein may be used by the General Contractor for his general information only.

GR-3 Drilled concrete piers are designed based on the following allowable values:

Depth Below Existing Grade (ft)	Allowable Unit Skin Friction (PSF)
0 – 5	Neglect
5 – 18	500
18 – 30	700

Allowable End Bearing Pressure(18-30 ft depth) 7000 PSF

All depths are referenced from the existing ground surface elevation at the boring locations during the time of the field investigation. The Contractor shall have available on site high-torque drilling equipment to achieve the necessary pier depths.

GR-4 Locate all existing utility lines prior to drilling piers.

SUBGRADE AND UNDERFLOOR FILL PREPARATION AT SLAB-ON-GRADE FOUNDATIONS

UF-1 The subgrade and underfloor fill shall be prepared to a point that extends 5'-0" minimum beyond the limits of the foundation. Refer to the geotechnical report for the preparation of the subgrade soils beneath the flatwork/sidewalks beyond this width.

UF-2 The subgrade and underfloor fill shall be prepared in accordance with the geotechnical report recommendations provided by Intertek-PSI which calls for the removal of a minimum six (6) foot depth of native soils and the installation of a minimum six (6) foot depth of compacted select fill material. Additional cut and fill may be required to accommodate the existing and finished grade elevations – See Grading Plan. The Contractor must take extreme care not to damage nor undermine the existing adjacent foundations to remain. Refer to Figure 3.1 and Table 3.1 in the Intertek-PSI report for specifications on the preparation of the subgrade and select fill pad to achieve a PVR of 1-inch or less.

UF-3 Perform all earthwork before trenching for grade beams or mechanical lines.

UF-4 Maintain subgrade and the fill at optimum insitu moisture content after completion of structural fill placement. This may include drying or wetting processes depending on the introduction or evaporation of moisture due to the weather and construction condition. The Testing Lab shall make a final site visit no sooner than two days prior to the concrete pour in order to verify and approve the structural fill condition including moisture content to be fit and in accordance with the contract documents, prior to pour. Contractor shall make all corrective work required to improve the subgrade and structural fill areas which are not acceptable to the Testing Lab prior to placement of concrete.

UF-5 The finish grading around the building shall be graded to ensure adequate drainage of surface water away from the building. All air conditioning condensate lines and roof gutter downspouts shall be directed to discharge a minimum of ten (10) feet away from the foundation for further removal from the site.

UF-6 Trenching of grade beams shall be excavated in order to provide the beam cross sections indicated. Beam and slab depths and widths as indicated are minimum acceptable sizes. Larger size beams and slabs formed by less accurate trenching may require additional reinforcing (not shown) which shall be determined by the Engineer during construction review. All loose soil from sides and bottoms of trenches shall be removed. If a toothed bucket is used, excavation with this bucket shall stop six (6) inches above final grade and the excavation completed with a smooth-bucket or by hand labor.

UF-7 Drain exposed grade beams during construction in the event of inclement weather.

CONCRETE/REINFORCING:

CR-1 All concrete (excluding concrete for piers) shall test 4000 PSI at 28 days. All concrete for piers shall test 3000 PSI at 28 days. All concrete shall be in accordance with ACI 301.

CR-2 Flyash shall not exceed 20 percent.

CR-3 There shall be no horizontal construction joints in concrete pours except where shown on details. The location of construction joints shall be as shown on the drawings.

CR-4 Bar support accessories shall be provided in accordance with the latest ACI manual of standard practice for detailing reinforced concrete structures, except that reinforcing shall be supported on bolsters spaced not more than 4 feet on center. Bar supports for concrete exposed to view shall have plastic coated legs or be hot dip galvanized after fabrication. Full brick supports may be used at the slab-on-grade foundation only.Do not use half bricks for bar supports.

CR-5 Do NOT run mechanical and electrical conduit in the slab on form deck.

CR-6 Where shown on the details, HCA stands for headed concrete anchors. Anchors shall conform to the requirements of ASTM A108, grades 1010, 1015, 1017, or 1020. Studs shall be automatically end welded in the shop or field in accordance with the manufacturer's recommendations. Remove ceramic ferrule prior to placing concrete.

CR-7 Where expansion bolts (exp. bolt) are shown, they shall be Hilti or Simpson Strong-Tie type or approved equal. All anchors shall be zinc plated meeting the requirements of ASTM B633. Expansion anchors shall be installed using minimum depths, edge distances and spacing (unless otherwise noted), as recommended by the anchor manufacturer and shall be tightened to the torque requirements of the manufacturer.

CR-8 All reinforcing steel shall be grade 60 and shall conform to the ASTM Specification A615. Detailing of reinforcing steel shall conform to the American Concrete Institute Detailing Manual. Lap continuous unscheduled reinforcing bars 40 bar diameters at splices. Beam steel at elevator tower beams must be continuous with NO splices for the entire length of the beam runs. Tie wire shall be 18 gage annealed type. Rebar shall not be heated with a torch in the field.

CR-9 Provide 1-#6 x 4'-0" L-shaped bar top and bottom of exterior face of grade beams and spandrel beams at corners.

CR-10 Welded wire shall conform to ASTM Specification A185 (flat sheets only).

CR-11 Provide stirrup support bars as required for the length of the stirrup spacing in all beams.

CR-12 Reinforcing steel coverage shall be as follows:

A. Grade Beams - 2 1/2" Top, 3" Bottom, 3" Sides
B. Piers - 3"

CR-13 Vertical steel in piers may be lapped in the top half of the pier. Top of lap shall be no closer to the pier cut-off than five feet. Only one lap per pier will be permitted. Lap lengths shall be as follows,

#6 Bar, 32 inches
#8 Bar, 43 inches
#9 Bar, 48 inches

Spirals to be lapped minimum of 1-1/2 turns.

CR-14 The contractor shall allow in his bid for an average of 1/2" of extra concrete on the mezzanine floor during placement of concrete due to deflection of structure.

CR-15 Vapor barrier shall be 10 mil polyethylene film for below grade application with a permeance of less than 0.3 US perms (ASTM E96). Vapor barrier shall be continuous with joints lapped a minimum of 12 inches and taped. The vapor barrier shall be installed in accordance with ASTM E1643.

CR-16 Provide "Z" transition bars (same size as beam reinforcement) where beam soffit step downs are greater than 6 inches.

CR-17 Concrete shall be placed and cured in accordance with ACI 302.1R. Finish tolerance shall be in accordance with ACI 117.

CR-18 Construct formwork to maintain tolerances outlined in ACI 347. Formwork shall extend a minimum of 6 inches below finished grade at perimeter beams.

CR-19 Refer to the Architectural Drawings for areas requiring colored concrete and/or special concrete finishes.

CR-20 Embed plates must be set and tied into the form before placing concrete, not into top of wet concrete. Any embed plates left out will require removal and re-pouring of concrete. Do NOT "wet set" ANY embed plates.

CR-21 All anchor bolts must be installed prior to concrete placement. The Contractor must fabricate templates (wood is acceptable) for the installation of the bolts. These templates must be coordinated by the Contractor with the approved anchor bolt shop drawings.

CR-22 Sawcut control joints into slab as early in the concrete placement process as possible as soon as the slab can support the weight of the workers and equipment without damage to the finished concrete surface. Unless noted otherwise, typically install control joints at mid-span from each beam line in both directions.

EPOXY

EX-1 Care shall be taken in placing post-installed anchors to avoid conflicts with existing rebar. Holes shall be drilled and cleaned in accordance with the manufacturer's written instructions. Substitution requests for products other than those specified below shall be submitted by the Contractor to the Engineer.

EX-2 All holes shall be drilled with a "Rotary Hammer" percussion drill. All holes shall have a diameter no larger than 1/8" greater than the diameter of the steel member being installed.

EX-3 All holes shall be cleaned with compressed air and shall be dry prior to installation of epoxy. Holes shall be free of all deleterious material such as laitance, dust, dirt, and oil.

EX-4 Steel shall be cleaned to a bright finish with wire brushes prior to installation. Prime surface as required by Manufacturer.

EX-5 Acceptable Products are HILTI RE 500 V3, HILTI HIT HY200 or Simpson Strong-Tie Set-XP or approved equal. Substitutions may be considered provided complete technical information is furnished to the Engineer and approved prior to commencement of work. In using the above products, follow strictly the manufacturer's specifications and directions for mixing and application. Also heed all label warnings by manufacturer. Make application in accordance with applicable safety laws.

MASONRY/GROUT

MG-1 Concrete masonry units (CMU) shall be lightweight (105 PCF) Grade N, Type I, moisture controlled units, conforming to the latest edition of ASTM C90. The average compressive strength of three individual units shall be 2,000 PSI. Refer to architectural drawings and/or specifications for unit size, face, color, jointing, etc.

MG-2 Mortar shall be type "S", utilizing pre-mixed sacks or shall have the proportions of the mix materials verified and approved in the field by the Testing Lab. When pre-mixed sacks are utilized, copies of the sack receipts must be submitted to the Engineer.

MG-3 Minimum 28-day compressive strength (f'm) of the masonry walls shall be equal to 2,000 PSI.

MG-4 Reinforce CMU walls where shown on the structural drawings. Fill all reinforced cells with 2,000 PSI grout.

MG-5 Provide #5 vertical rebars at all corners, ends of walls, each side of control joints and each side of wall openings. See Typical Detail. See Architectural drawings for location of control joints.

MG-6 Dowels into supporting members shall be the same size and spacing as vertical reinforcement. Extend dowels 2'-6" into the supporting members unless noted otherwise.

MG-7 All reinforcement and dowels shall have a lap splice length of 50 bar diameters unless noted otherwise.

MG-8 All vertical steel shall be positioned in the wall using "Rebar Positioners" by AA Wire Products Co. unless specifically detailed otherwise.

MG-9 Provide standard galvanized truss-type horizontal joint reinforcement of 9 gage wire every other course (16" on center) in typical walls and every course (8" on center) in parapet walls. Side rods shall be deformed wire and cross rods shall be plain wire, both complying with ASTM A82. Lap 6" minimum. Provide prefabricated L and T-shaped units at corners and intersections.

MG-10 Provide a continuous 8" deep concrete filled bond beam at the top of each wall and at the sill of openings. See bond beam schedule. Provide 1-#6 x 4'-0" L-shaped bar at corners.

MASONRY TESTING REQUIREMENTS

Testing Method Options	Prior to Construction	During Construction
Method I		
Masonry Prism Testing	5 Prisms	3 Prisms for every 5,000 s.f. of wall
Method II		
Masonry Prism Test Record	Approved 30 Prism Record	3 Prisms for every 5,000 s.f. of wall
Method III		
Unit Strength Method	Units and Grout or 5 prism	Units and Grout or 3 prisms for every 5,000 s.f. of wall

STRUCTURAL STEEL

ST-1 All structural steel shall conform to ASTM Specifications A36 except wide flange shapes shall conform to ASTM A992 GR50. Pipe members shall conform to ASTM A501 or A53, grade B. Square or rectangular tube shapes shall conform to ASTM A500, grade B. Structural steel details and connections shall conform to the standards of the AISC. Splicing of structural steel members is prohibited without prior approval of the Engineer as to location and type of splice to be made. Any member having a splice not shown and detailed on shop drawings will be rejected. All welding shall conform to the American Welding Society Code. Use E70 series electrodes for all structural steel welds. Continuous weld all cap plates and base plates to columns.

ST-2 All connections shall have 3/4" diameter bolts at 3" on center for full depth of beam as a minimum. Field connections shall be equivalent to standard bolted connections using 3/4" diameter ASTM A325X bolts unless otherwise shown. Connections shall be bolted or welded - See details. Provide web connections for steel beams at columns unless otherwise noted. Unless otherwise noted on the drawings, the reactions for each end of beam shall be designed using 1/2 of the tabulated allowable load for the given span as tabulated in Part 2 of the AISC manual of steel construction.

ST-3 All structural steel members must be hot-dip galvanized.

ST-4 Ultrasonic inspection by the testing laboratory shall be provided for all welds called for on the drawings or on the shop drawings as penetration welds.

ST-5 Provide 3/8" column cap plate where joist bears on column and 3/4" column cap plate where beam bears on column.

ST-6 All connection plates and angles for structural steel shall be 3/8" thick at 3/4" diameter bolts and 1/2" thick at 1" diameter bolts.

ST-7 Provide 1/4" stiff PL's on all cantilever beams at centerline of column on both sides of beam.

ST-8 Unless noted otherwise on the Architectural Drawings, all structural steel members Not referenced in Note ST-3 shall receive the manufacturer's standard primer. General Contractor shall apply touch up paint as needed in the field.

ST-9 All columns bearing on embed plates are classified as "POSTS" and are NOT designed for eccentric load of erection personnel. Do NOT climb on posts supported by embed plates or structural members supported by posts until they are fully welded to embed plates.

ELEVATOR MISCELLANEOUS STEEL

EL-1 General Contractor shall be responsible for supplying and installing supplementary framing at roof and floor elevations as required by elevator manufacturer to support guide rails at no additional cost to the owner. Coordinate size and location of supplementary framing with elevator supplier and structural steel supplier.

EL-2 Refer to framing plan and details for hoist beam. Contractor shall coordinate hoist beam requirements with Elevator Manufacturer.

EL-3 General Contractor must coordinate all elevator pit and sump pit dimensions with the manufacturer's shop drawings prior to forming pits, ordering of reinforcement and placement of concrete.

ROOF DECK

RD-1 Roof deck shall be 1.5" deep 22 gage wide rib galvanized metal deck type 1.5B22 as manufactured by Vulcraft or approved equal. Deck shall conform to SDI standards and shall have the following properties:

Ip = 0.155 IN4/FT
In = 0.183 IN4/FT
Sp = 0.186 IN3/FT
Sn = 0.192 IN3/FT
Fy = 33 K.S.I.

Minimum steel thickness before coating = 0.0295 in.

RD-2 Lap ends of deck 3" at supports. Attach Roof Deck to supports in accordance with the Typical Detail on the plans. Deck shall be galvanized G60.

SLABS ON FORM DECK CONSTRUCTION

FD-1 Floor slabs shall be 4", 4000 PSI normal-weight concrete on 1 1/2" deep, 20 gage galvanized corrugated metal deck 1.5C220 as manufactured by Vulcraft or approved equal. Each deck sheet shall span over at least 4 supports. Deck shall conform to SDI Standards and shall have the following properties:

Ip = 0.222 IN4/FT
In = 0.186 IN4/FT
Sp = 0.231 IN3/FT
Sn = 0.224 IN3/FT
Fy = 50 K.S.I.

Reinforce slabs with 4" x 4" - W2.9 x W2.9 welded wire mesh flat sheets only lapped one mesh plus 2" at ends and sides. Deck shall be galvanized G90. The mesh must be draped over the supports (beams) via the use of a high chair over the supports to position mesh 3/4" from the top of the slab at the supports and 3/4" from the bottom of the slab between the supports.

FD-2 Attach floor deck to supports with 5/8" diameter puddle welds in each flute made through the manufacturer's standard weld washers and with #10 TEK screws at 12-inch centers at sidelaps. Lap corrugated metal deck 3" at ends and sides of sheet.

TEXAS DEPARTMENT OF INSURANCE WINDSTORM INSPECTION REQUIREMENTS

TDI-1 All exterior doors, windows, and louvers must comply with and be installed in accordance with ASTM E1886, ASTM E1996 and TDI requirements. Attachment details to the foundation and structure must be included in the Manufacturer's shop drawings. (Deferred Submittal)

TDI-2 Submit P.E. sealed shop drawings for all exterior doors, windows, and louvers to be installed showing compliance with the above listed requirements and applicable wind loads. The installation method to be used must be clearly shown on the shop drawings. The installation method must have accompanying TDI approved documentation. (Deferred Submittal)

TDI-3 The Structural Engineer must be allowed to inspect the installation of all door, window, and louver fasteners prior to the installation of the glazing.

TDI-4 Submit shop drawings for TDI compliant roof assembly. The installation of the TDI approved roofing system must be inspected by the Testing Lab. RTU curbs and curb and anchorage details must be included in the roofing submittals. (Deferred Submittal)

INSPECTION BY THE TESTING LAB

TL-1 The testing lab shall provide special inspection of the following items in accordance with the code. Re-inspect as required until all items pass inspection. Written reports shall be submitted to the Engineer.

1. Drilled Piers: During the excavation of all piers to verify proper bearing elevation and strata and to inspect all pier steel and dowels prior to placing concrete.
2. Subgrade and Select Fill Pad: The prepared subgrade and each lift of select fill material shall be tested, evaluated and reworked as necessary until approved by the Testing Lab prior to placement of additional lifts. Refer to the geotechnical report for the frequency of tests.
3. Concrete: During the taking of test specimens and placing of reinforced concrete.
4. Bolts and Embed Plates Installed in Concrete: Prior to and during the placement of concrete around bolts and embed plates.
5. Reinforcing Steel: Inspect all rebar prior to placing concrete.
6. Roof Deck: Inspect all welds, screws, and attachment pattern for conformance to details.
7. Field Welds: Inspect all field welds.
8. Reinforced CMU: Inspect placing of all masonry units, placement of reinforcement, inspection of grout space, immediately prior to closing of cleanouts, and during all grouting operations.

TL-2 The testing lab shall provide testing and inspection services for all items listed in Chapter 17 of the International Building Code. Re-inspect as required until all items pass inspection. Written reports shall be submitted to the Engineer.

TL-3 Periodic site observations by the Testing Lab are solely for the purpose of determining if the work of the Contractor is proceeding in general accordance with the structural contract documents. These limited site observations should not be construed as exhaustive or continuous to check the quality or quantity of the work, but rather periodic in an effort to guard the Owner against defects or deficiencies in the work of the Contractor.

TL-4 The Contractor shall notify the Testing Lab 48 hours in advance of any concrete placement.

TL-5 The Contractor shall not place any concrete until all reinforcing steel placement has been reviewed by the Testing Lab AND all corrections made by the Contractor. It is the Contractor's responsibility to ensure that all corrections have been made.

TL-6 Do not cover up structural framing until it has been reviewed by the Testing Lab.

MISCELLANEOUS

M-1 Typical details shall apply to ALL such situations and conditions which are similar to the condition shown on the detail or verbally described in the title of the detail or notes on the detail. Typical details shall apply regardless of whether or not the detail section mark is cut on the plans.

M-2 Concrete shall be placed in piers immediately after excavation.

M-3 See Architectural/Civil drawings for floor elevations, slopes, and the location of depressed floor areas.

M-4 The Contractor shall compare Structural sections with Architectural sections and report any discrepancy to the architect prior to fabrication or installing structural members.

M-5 Do not install plumbing pipes in beam trenches. Do not penetrate beams without Engineer's approval.

M-6 Changes shall not be made to the drawings without written approval of the Engineer.

M-7 Shop drawings shall be submitted for all structural items including concrete mix design, rebar, epoxy, structural steel, metal roof deck, metal floor deck, steel stairs, cmu product data, and light-gage metal stud components.

The Contractor must submit all shop drawings for review a minimum of ten (10) working days prior to their due date back to the supplier. Failure to do so will be the responsibility of the Contractor.

SITE OBSERVATION BY THE STRUCTURAL ENGINEER

SV-1 Periodic site observations by field representatives of REM Engineering are solely for the purpose of determining if the work of the Contractor is proceeding in general accordance with the structural contract documents. These limited site observations should not be construed as exhaustive or continuous to check the quality or quantity of the work, but rather periodic in an effort to guard the Owner against defects or deficiencies in the work of the Contractor.

SV-2 The Contractor shall notify the Engineer and Testing Lab 48 hours in advance of any concrete placement.

SV-3 The Contractor shall not place any concrete until all reinforcing steel placement has been reviewed by the Structural Engineer AND all corrections made by the Contractor. It is the Contractor's responsibility to ensure that all corrections have been made.

SV-4 Do not cover up structural framing until it has been reviewed by the Engineer.

REPRODUCTION NOTE

R-1 The use of reproductions of these contract drawings by any contractor, subcontractor, erector, fabricator, or material supplier in lieu of preparation of shop drawings signifies his acceptance of all information shown hereon as correct, and obligates himself to any job expense, real or implied, arising due to any errors that may occur hereon.

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO
CALALLEN INDEPENDENT SCHOOL DISTRICT
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DATE ISSUED:
11.11.2025

PROJECT NUMBER:
1092-0325

PLAN NORTH / TRUE NORTH

SHEET NAME
GENERAL NOTES

SHEET NUMBER
S4-1

STATE OF TEXAS
ROBERT ENRIQUEZ MARTINEZ
89387
LICENSED PROFESSIONAL ENGINEER
11-11-25
THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY ROBERT E. MARTINEZ, P.E. # 89387 T.B.P.E. FIRM NO. 6944

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REM PROJECT NO: 25-120

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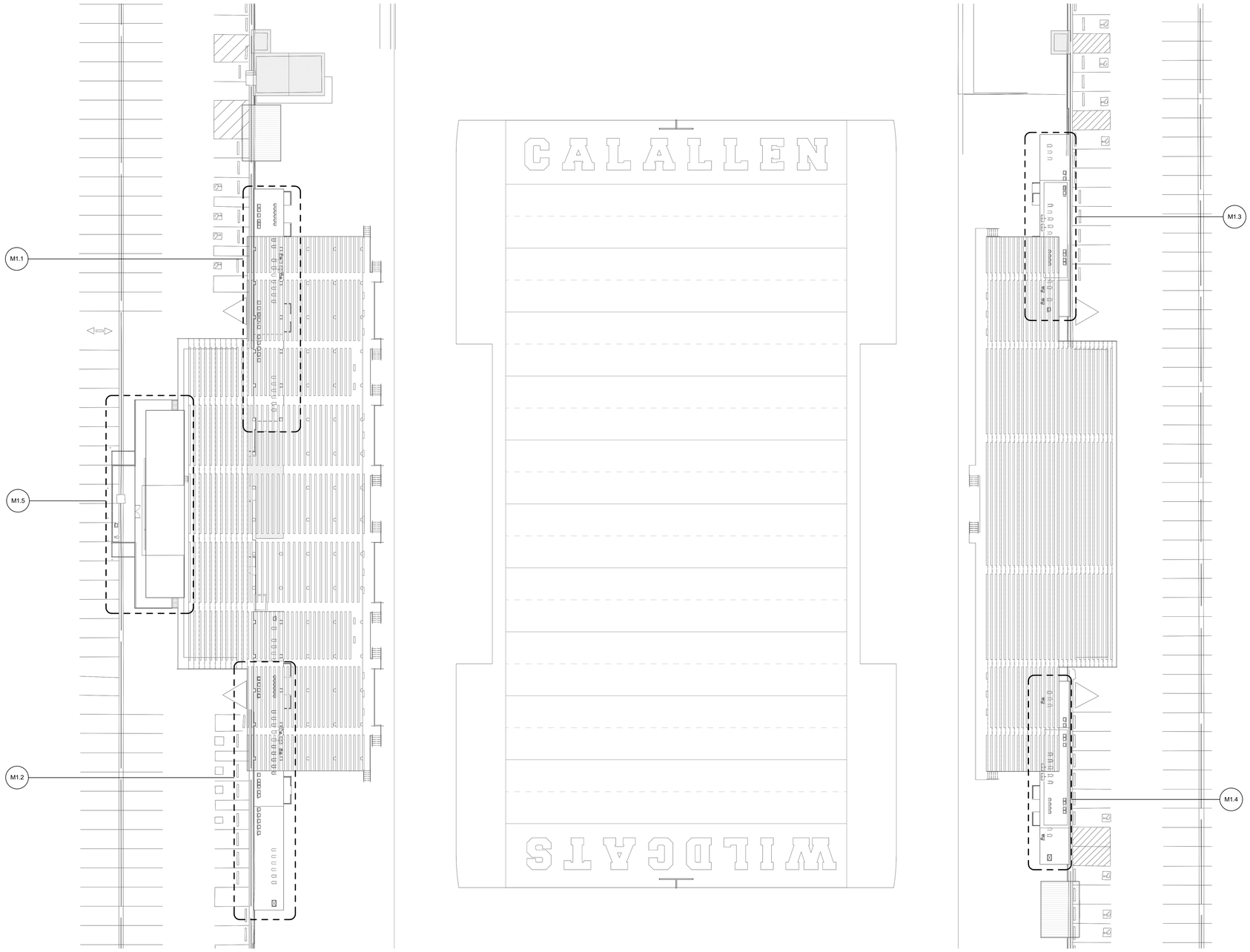

1 HVAC OVERALL PLAN
3/64" = 1'-0"

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11/11/2025

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Registration # F-006328

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CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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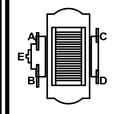
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
HVAC OVERALL PLAN

SHEET NUMBER
M1.0

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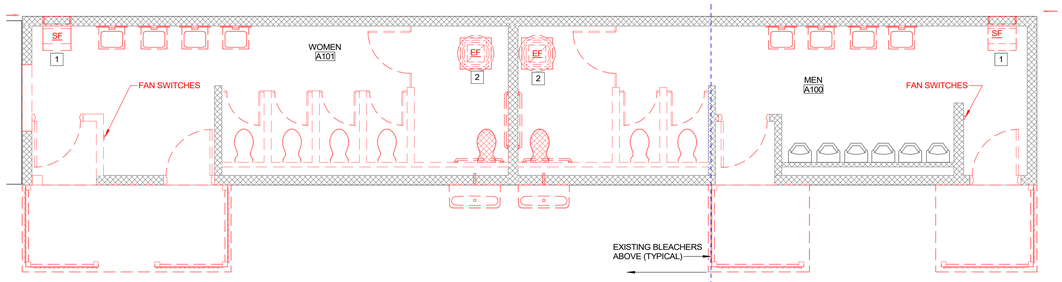
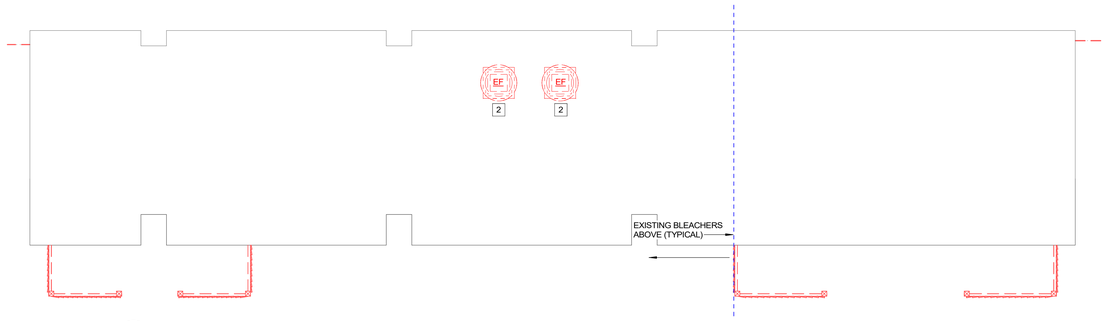
HVAC DRAWING LEGEND

- ARCHITECTURAL OR PLUMBING TO BE DEMOLISHED
- MECHANICAL EQUIPMENT OR DUCTWORK TO BE DEMOLISHED
- EXISTING BOUNDARY OF BLEACHERS ABOVE
- NEW EQUIPMENT
- NEW EXHAUST EQUIPMENT AND/OR DUCTWORK
- OC NEW OCCUPANCY SENSOR
- T NEW THERMOSTAT



TRUE PLAN 1 HVAC DEMOLITION PLAN - HOME SIDE NORTHWEST RESTROOMS
1/4" = 1'-0"



TRUE PLAN 2 HVAC DEMOLITION ROOF PLAN - HOME SIDE NORTHWEST RESTROOMS
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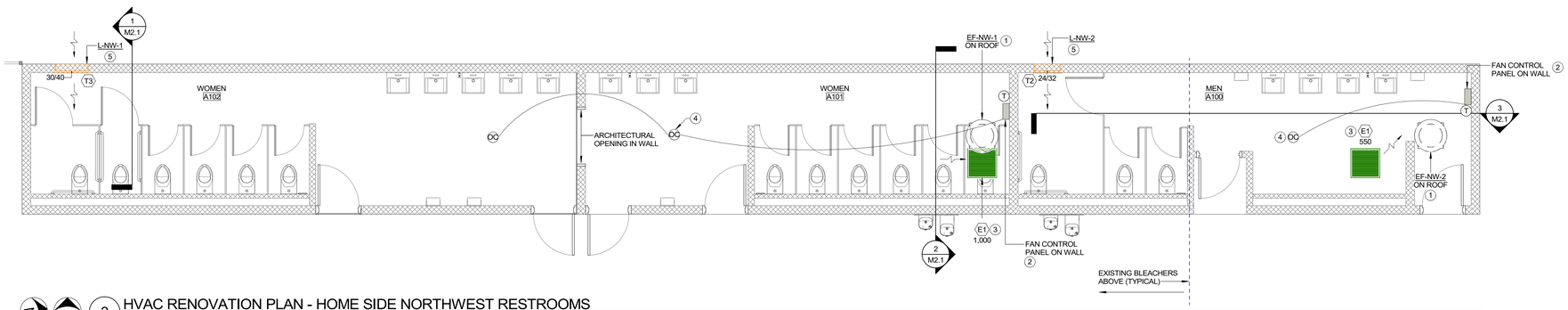

TRUE PLAN 3 HVAC RENOVATION PLAN - HOME SIDE NORTHWEST RESTROOMS
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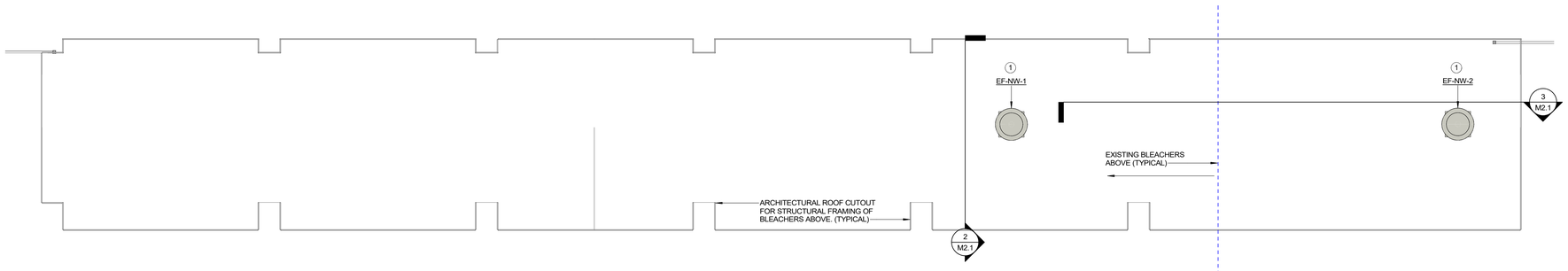

TRUE PLAN 4 HVAC RENOVATION ROOF PLAN - HOME SIDE NORTHWEST RESTROOMS
1/4" = 1'-0"

HVAC DEMOLITION KEYED NOTES: M1.1

1. DEMOLISH EXISTING SUPPLY FAN ON WALL AND PERMANENTLY PATCH MASONRY WALL.
2. DEMOLISH ROOF FAN, ROOF CURB AND ANY CONNECTING DUCTWORK AND AIR DEVICES. PERMANENTLY PATCH THE ROOF DECK.

HVAC RENOVATION KEYED NOTES: M1.1

1. INSTALL NEW EF ON ROOF WITH ROOF CURB. REFER TO DETAIL 7, SHEET M6.1.
2. PROVIDE FAN CONTROL PANEL MOUNTED ON WALL 1" BELOW THE BOTTOM OF THE CEILING. HVAC CONTRACTOR SHALL INSTALL THE PANEL WITH ALL CONTROL DEVICES, TERMINATE ALL WIRING AND COMMISSION THE SYSTEMS. REFER TO FAN CONTROL PANEL SCHEMATIC 4, SHEET M6.2.
3. INSTALL EXHAUST AIR DEVICE IN CEILING OPEN TO EXHAUST AIR PLENUM ABOVE. FRAME OUT THE OPENING AND SECURE THE GRILLE TO THE CEILING STRUCTURE.
4. REFER TO ELECTRICAL DRAWINGS FOR OCCUPANCY SENSORS PROVIDED BY THE ELECTRICAL CONTRACTOR. (TYPICAL)
5. CONTRACTOR SHALL SAW CUT EXISTING CONCRETE BLOCK WALLS AND INSTALL NEW LOUVER IN ACCORDANCE WITH ARCHITECTURAL DETAILS AND ANCHOR THE LOUVER TO THE WALL IN ACCORDANCE WITH WINDSTORM CODE REQUIREMENTS. HVAC CONTRACTOR SHALL INSTALL STAINLESS STEEL WALL GRILLE FLUSH OVER THE WALL OPENING AND SECURE TO THE WALL WITH ANCHORS FOR A FINISHED LOOK.

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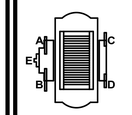

PLAN NORTH TRUE NORTH

SHEET NAME
HVAC PLANS - HOME SIDE NORTHWEST RESTROOMS
SHEET NUMBER

M1.1

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HVAC DRAWING LEGEND

- ARCHITECTURAL OR PLUMBING TO BE DEMOLISHED
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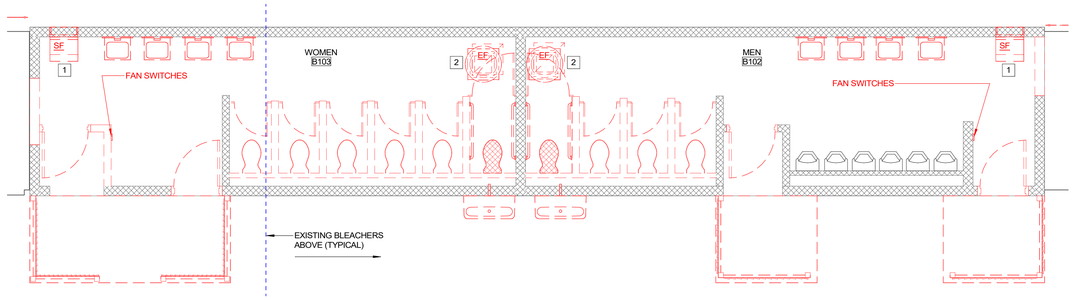
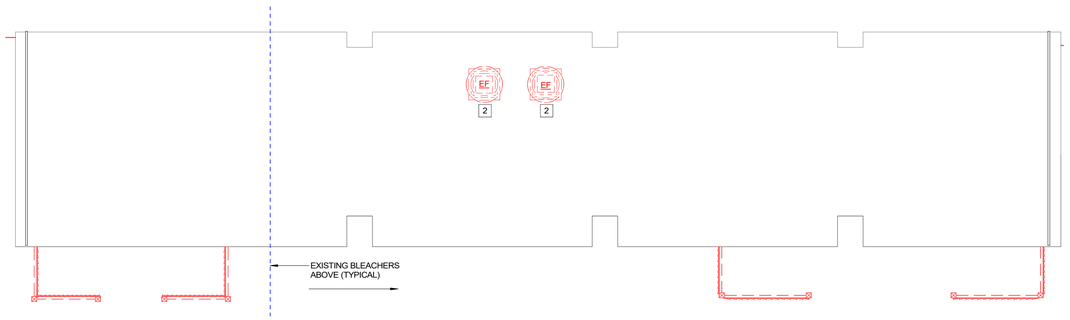


TRUE PLAN 1 HVAC DEMOLITION FLOOR PLAN - HOME SIDE SOUTHWEST RESTROOMS
1/4" = 1'-0"



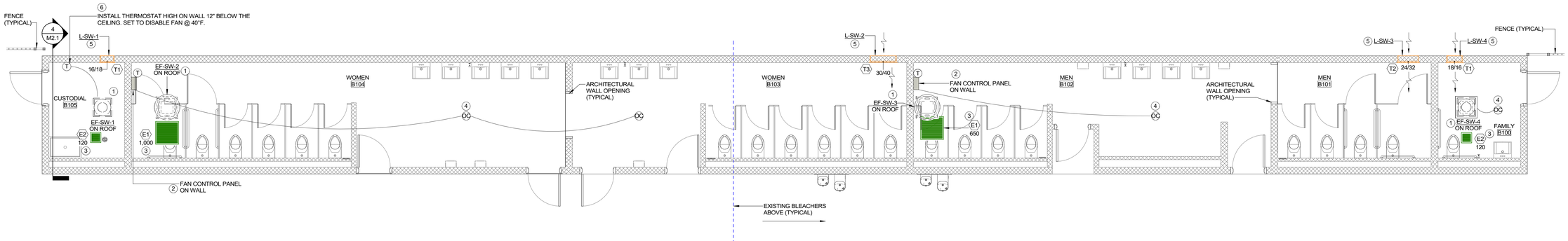
TRUE PLAN 2 HVAC DEMOLITION ROOF PLAN - HOME SIDE SOUTHWEST RESTROOMS
1/4" = 1'-0"

HVAC DEMOLITION KEYED NOTES: M1.2

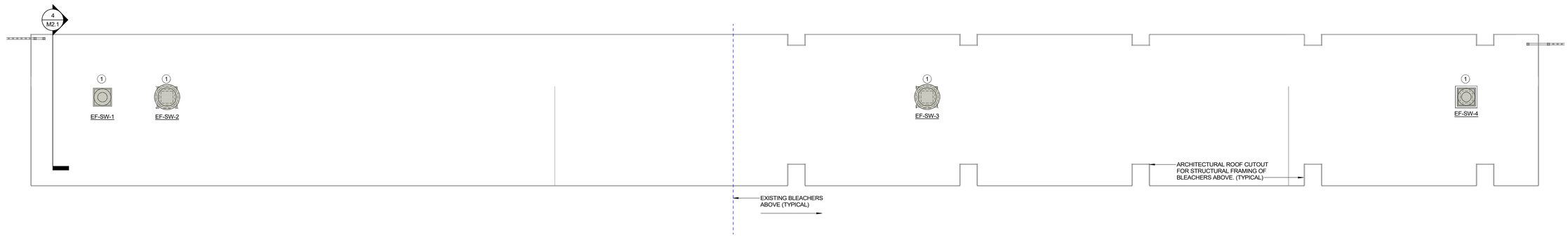
1. DEMOLISH EXISTING SUPPLY FAN ON WALL AND PERMANENTLY PATCH MASONRY WALL.
2. DEMOLISH ROOF FAN, ROOF CURB AND ANY CONNECTING DUCTWORK AND AIR DEVICES. PERMANENTLY PATCH THE ROOF DECK.

HVAC RENOVATION KEYED NOTES: M1.2

1. INSTALL NEW EF ON ROOF WITH ROOF CURB. REFER TO DETAIL 7, SHEET M6.1.
2. PROVIDE FAN CONTROL PANEL MOUNTED ON WALL 1" BELOW THE BOTTOM OF THE CEILING. HVAC CONTRACTOR SHALL INSTALL THE PANEL WITH ALL CONTROL DEVICES, TERMINATE ALL WIRING AND COMMISSION THE SYSTEMS. REFER TO FAN CONTROL PANEL SCHEMATIC 4, SHEET M6.2.
3. INSTALL EXHAUST AIR DEVICE IN CEILING OPEN TO EXHAUST AIR PLENUM ABOVE. FRAME OUT THE OPENING AND SECURE THE GRILLE TO THE CEILING STRUCTURE.
4. REFER TO ELECTRICAL DRAWINGS FOR OCCUPANCY SENSORS PROVIDED BY THE ELECTRICAL CONTRACTOR. (TYPICAL)
5. CONTRACTOR SHALL SAW CUT EXISTING CONCRETE BLOCK WALLS AND INSTALL NEW LOUVER IN ACCORDANCE WITH ARCHITECTURAL DETAILS AND ANCHOR THE LOUVER TO THE WALL IN ACCORDANCE WITH WINDSTORM CODE REQUIREMENTS. HVAC CONTRACTOR SHALL INSTALL STAINLESS STEEL WALL GRILLE FLUSH OVER THE WALL OPENING AND SECURE TO THE WALL WITH ANCHORS FOR A FINISHED LOOK.
6. HVAC CONTRACTOR SHALL FURNISH HIGH VOLTAGE CONTROL THERMOSTAT FOR INSTALLATION BY THE ELECTRICAL CONTRACTOR.



TRUE PLAN 3 HVAC RENOVATION FLOOR PLAN - HOME SIDE SOUTHWEST RESTROOMS
1/4" = 1'-0"



TRUE PLAN 4 HVAC RENOVATION ROOF PLAN - HOME SIDE SOUTHWEST RESTROOMS
1/4" = 1'-0"

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Registration # F-006328

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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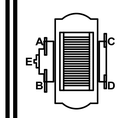
DATE ISSUED:
11/11/2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH TRUE NORTH

SHEET NAME
HVAC PLANS - HOME SIDE SOUTHWEST RESTROOMS
SHEET NUMBER

M1.2

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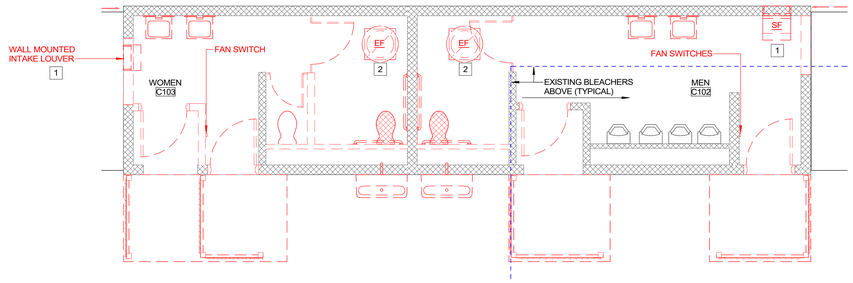
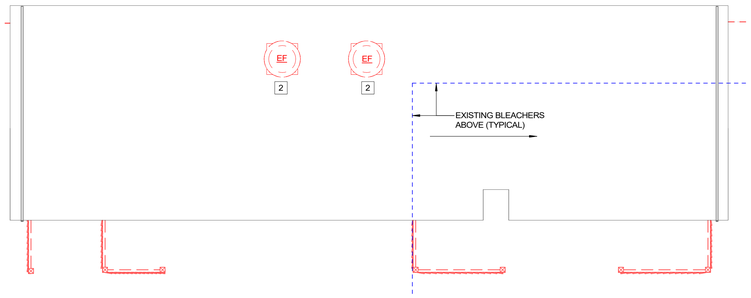


TRUE NORTH PLAN

1 HVAC DEMOLITION FLOOR PLAN - VISITOR SIDE NORTHEAST RESTROOMS

1/4" = 1'-0"



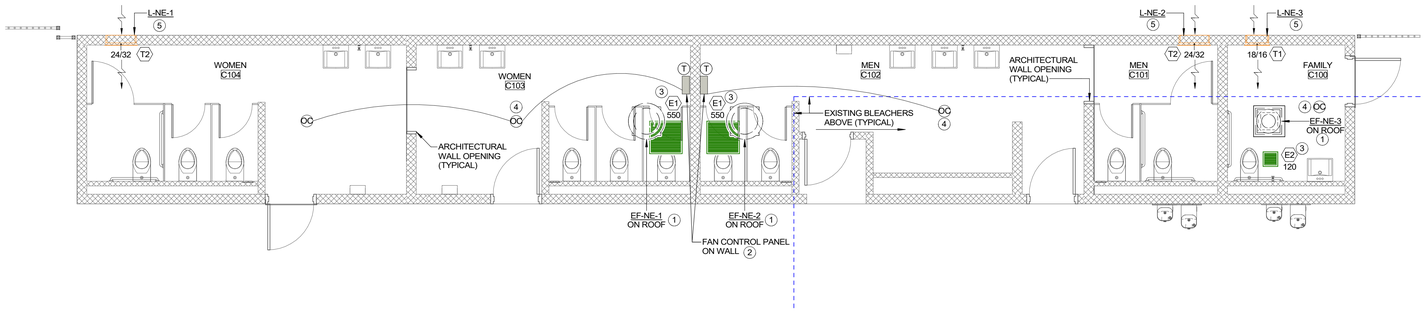
TRUE NORTH PLAN

2 HVAC DEMOLITION ROOF PLAN - VISITOR SIDE NORTHEAST RESTROOMS

1/4" = 1'-0"

HVAC DRAWING LEGEND

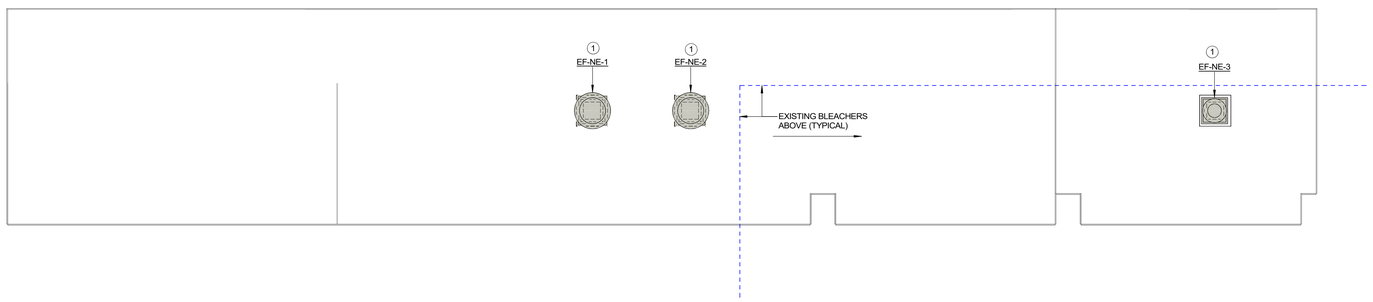
- ARCHITECTURAL OR PLUMBING TO BE DEMOLISHED
- MECHANICAL EQUIPMENT OR DUCTWORK TO BE DEMOLISHED
- EXISTING BOUNDARY OF BLEACHERS ABOVE
- NEW EQUIPMENT
- NEW EXHAUST EQUIPMENT AND/OR DUCTWORK
- OC — NEW OCCUPANCY SENSOR
- T — NEW THERMOSTAT



TRUE NORTH PLAN

3 HVAC RENOVATION FLOOR PLAN - VISITOR SIDE NORTHEAST RESTROOMS

1/4" = 1'-0"



TRUE NORTH PLAN

4 HVAC RENOVATION ROOF PLAN - VISITOR SIDE NORTHEAST RESTROOMS

1/4" = 1'-0"

HVAC DEMOLITION KEYED NOTES: M1.3

1. DEMOLISH EXISTING SUPPLY FAN ON WALL AND PERMANENTLY PATCH MASONRY WALL.
2. DEMOLISH ROOF FAN, ROOF CURB AND ANY CONNECTING DUCTWORK AND AIR DEVICES. PERMANENTLY PATCH THE ROOF DECK.

HVAC RENOVATION KEYED NOTES: M1.3

1. INSTALL NEW EF ON ROOF WITH ROOF CURB. REFER TO DETAIL 7, SHEET M6.1.
2. PROVIDE FAN CONTROL PANEL MOUNTED ON WALL 1" BELOW THE BOTTOM OF THE CEILING. HVAC CONTRACTOR SHALL INSTALL THE PANEL WITH ALL CONTROL DEVICES. TERMINATE ALL WIRING AND COMMISSION THE SYSTEMS. REFER TO FAN CONTROL PANEL SCHEMATIC 4, SHEET M6.2.
3. INSTALL EXHAUST AIR DEVICE IN CEILING OPEN TO EXHAUST AIR PLENUM ABOVE. FRAME OUT THE OPENING AND SECURE THE GRILLE TO THE CEILING STRUCTURE.
4. REFER TO ELECTRICAL DRAWINGS FOR OCCUPANCY CENSORS PROVIDED BY THE ELECTRICAL CONTRACTOR. (TYPICAL)
5. CONTRACTOR SHALL SAW CUT EXISTING CONCRETE BLOCK WALLS AND INSTALL NEW LOUVER IN ACCORDANCE WITH ARCHITECTURAL DETAILS AND ANCHOR THE LOUVER TO THE WALL IN ACCORDANCE WITH WINDSTORM CODE REQUIREMENTS. HVAC CONTRACTOR SHALL INSTALL STAINLESS STEEL WALL GRILLE FLUSH OVER THE WALL OPENING AND SECURE TO THE WALL WITH ANCHORS FOR A FINISHED LOOK.

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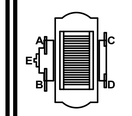

PLAN NORTH
TRUE NORTH

SHEET NAME
HVAC PLANS - VISITOR SIDE NORTHEAST RESTROOMS
SHEET NUMBER

M1.3

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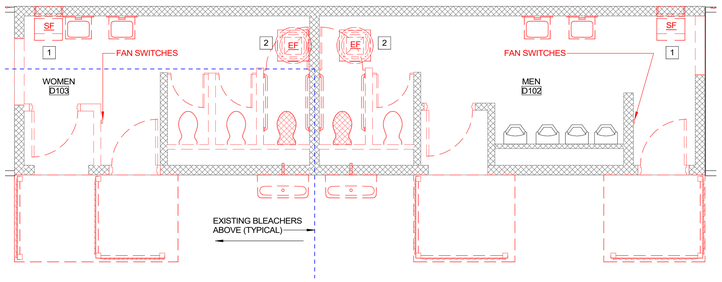
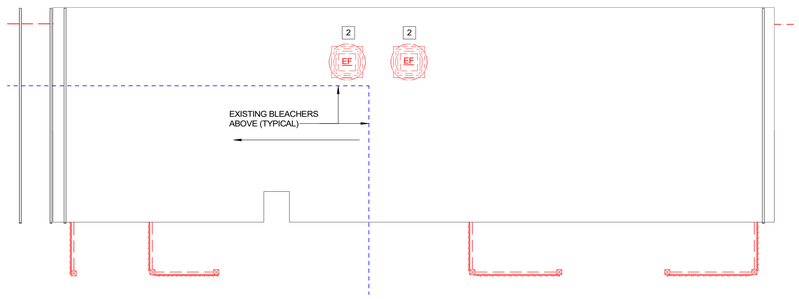


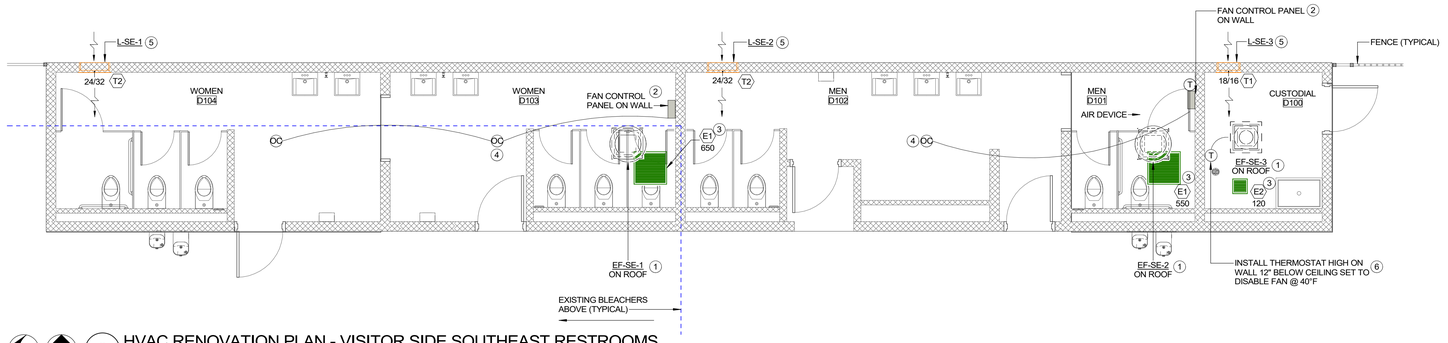
TRUE PLAN **1 HVAC DEMOLITION PLAN - VISITOR SIDE SOUTHEAST RESTROOMS**
1/4" = 1'-0"



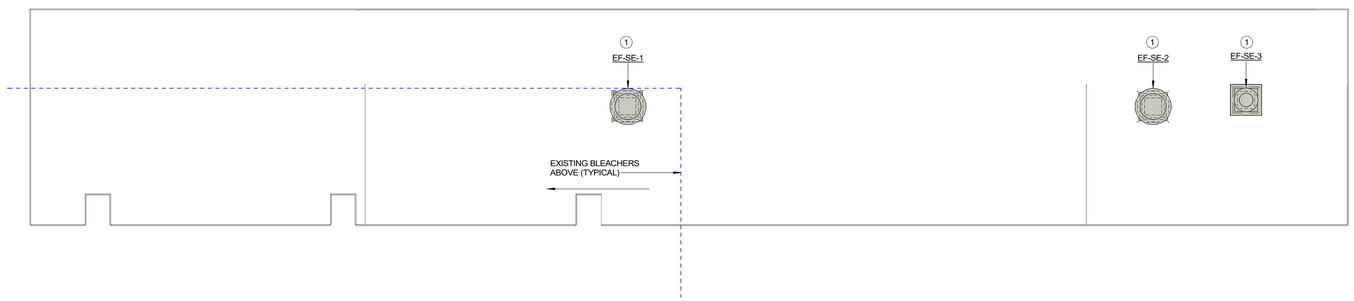
TRUE PLAN **2 HVAC DEMOLITION ROOF PLAN - VISITOR SIDE SOUTHEAST RESTROOMS**
1/4" = 1'-0"

HVAC DRAWING LEGEND

- ARCHITECTURAL OR PLUMBING TO BE DEMOLISHED
- MECHANICAL EQUIPMENT OR DUCTWORK TO BE DEMOLISHED
- EXISTING BOUNDARY OF BLEACHERS ABOVE
- NEW EQUIPMENT
- NEW EXHAUST EQUIPMENT AND/OR DUCTWORK
- OC NEW OCCUPANCY SENSOR
- T NEW THERMOSTAT



TRUE PLAN **3 HVAC RENOVATION PLAN - VISITOR SIDE SOUTHEAST RESTROOMS**
1/4" = 1'-0"



TRUE PLAN **4 HVAC RENOVATION ROOF PLAN - VISITOR SIDE SOUTHEAST RESTROOMS**
1/4" = 1'-0"

HVAC DEMOLITION KEYED NOTES: M1.4 □

1. DEMOLISH EXISTING SUPPLY FAN ON WALL AND PERMANENTLY PATCH MASONRY WALL.
2. DEMOLISH ROOF FAN, ROOF CURB AND ANY CONNECTING DUCTWORK AND AIR DEVICES. PERMANENTLY PATCH THE ROOF DECK.

HVAC RENOVATION KEYED NOTES: M1.4 ○

1. INSTALL NEW EF ON ROOF WITH ROOF CURB. REFER TO DETAIL 7, SHEET M6.1.
2. PROVIDE FAN CONTROL PANEL MOUNTED ON WALL 1" BELOW THE BOTTOM OF THE CEILING. HVAC CONTRACTOR SHALL INSTALL THE PANEL WITH ALL CONTROL DEVICES. TERMINATE ALL WIRING AND COMMISSION THE SYSTEMS. REFER TO FAN CONTROL PANEL SCHEMATIC 4, SHEET M6.2.
3. INSTALL EXHAUST AIR DEVICE IN CEILING OPEN TO EXHAUST AIR PLENUM ABOVE. FRAME OUT THE OPENING AND SECURE THE GRILLE TO THE CEILING STRUCTURE.
4. REFER TO ELECTRICAL DRAWINGS FOR OCCUPANCY SENSORS PROVIDED BY THE ELECTRICAL CONTRACTOR. (TYPICAL)
5. CONTRACTOR SHALL SAW CUT EXISTING CONCRETE BLOCK WALLS AND INSTALL NEW LOUVER IN ACCORDANCE WITH ARCHITECTURAL DETAILS AND ANCHOR THE LOUVER TO THE WALL IN ACCORDANCE WITH WINDSTORM CODE REQUIREMENTS. HVAC CONTRACTOR SHALL INSTALL STAINLESS STEEL WALL GRILLE FLUSH OVER THE WALL OPENING AND SECURE TO THE WALL WITH ANCHORS FOR A FINISHED LOOK.
6. HVAC CONTRACTOR SHALL FURNISH HIGH VOLTAGE CONTROL THERMOSTAT FOR INSTALLATION BY THE ELECTRICAL CONTRACTOR.

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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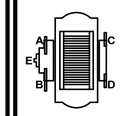
1092-0325

KEY PLAN (NTS)



PLAN NORTH TRUE NORTH

SHEET NAME
HVAC PLANS - VISITOR SIDE SOUTHEAST RESTROOMS
SHEET NUMBER

M1.4

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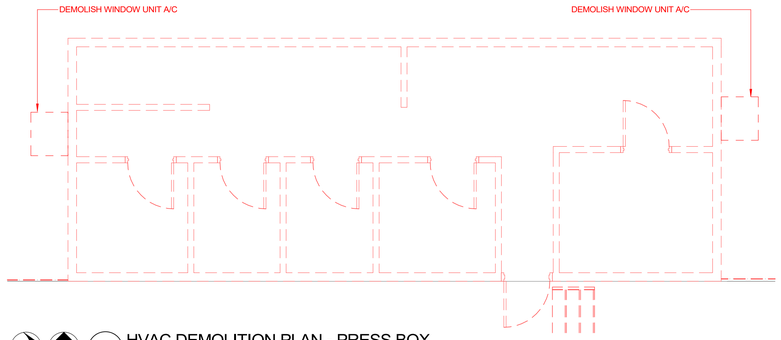
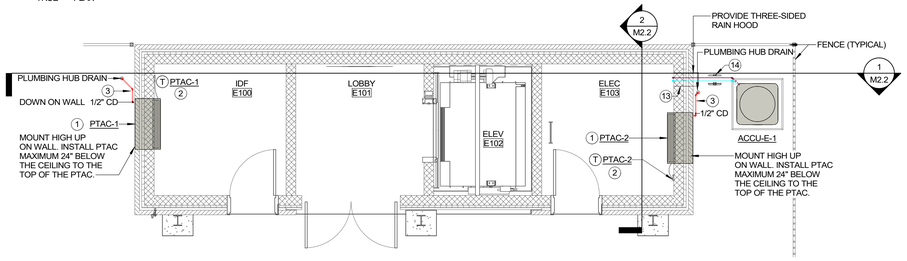
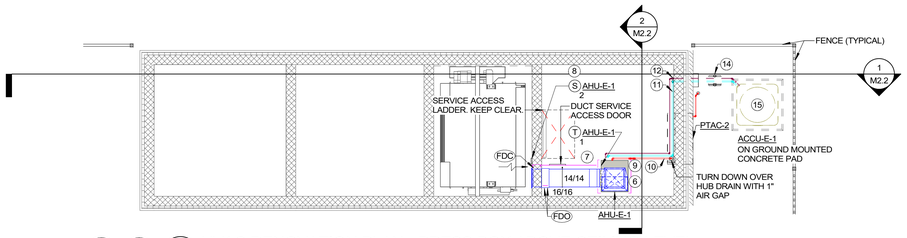


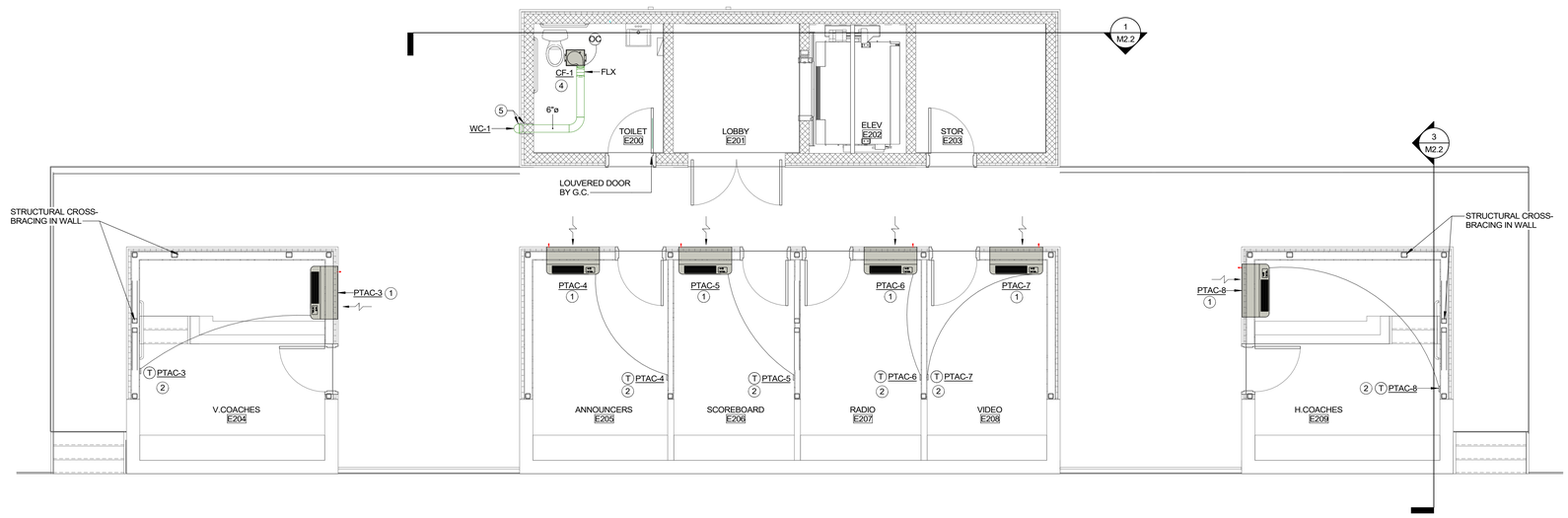
1 HVAC DEMOLITION PLAN - PRESS BOX
1/4" = 1'-0"



2 HVAC RENOVATION PLAN - PRESS BOX GROUND LEVEL
1/4" = 1'-0"



3 HVAC RENOVATION PLAN - PRESS BOX ABOVE CEILING LEVEL
1/4" = 1'-0"



4 HVAC RENOVATION PLAN - PRESS BOX UPPER LEVEL
1/4" = 1'-0"

HVAC RENOVATION KEYED NOTES: M1.5

1. INSTALL PTAC UNIT IN WALL WITH SLEEVE IN ACCORDANCE WITH DETAILS 1, 2 AND 3, SHEET M6.2.
2. HVAC CONTRACTOR SHALL PROVIDE WALL MOUNTED THERMOSTAT AND WIRE TO PTAC UNIT CONTROL PANEL.
3. ROUTE 1/2" CONDENSATE DRAIN PIPING DOWN ON WALL TO PLUMBING HUB DRAIN AND SUPPORT PIPE IN RISER WITH GALVANIZED STEEL WALL CLAMPS. TURN PIPE DOWN OVER HUB. COORDINATE WORK WITH PLUMBING CONTRACTOR.
4. PROVIDE CABINET EXHAUST FAN IN ACCORDANCE WITH DETAIL 6, SHEET M6.1.
5. PROVIDE STAINLESS STEEL WALL SLEEVE AT EXHAUST DUCT WALL PENETRATION. SEAL WATER TIGHT TO WALL WATER PROOFING. SECURE WALL CAP TO WALL WITH SCREWS.
6. INSTALL AHU ON STRUT OR ANGLE IRON PLATFORM, 30" HIGH WITH SHEET METAL ON ALL SIDES. INSULATE WITH 1.5" INSULATION LINER. PROVIDE REMOVABLE FRONT ACCESS PANEL WITH SCREWS. SET AIR FILTER ON TOP OF PLATFORM AND SECURE TO THE BASE. SECURE AHU TO AIR FILTER WITH SCREWS AND SEAL AIR TIGHT.
7. PROVIDE THERMOSTAT ON THE SIDE OF THE AHU AND WIRE AHU AND ACCU TOGETHER.
8. PROVIDE REMOTE MOUNTED SPACE SENSOR ON THE WALL ADJACENT TO THE RETURN AIR OPENING AND WIRE TO AHU THERMOSTAT. PROVIDE WALL ACCESS DOOR OR ACCESS THROUGH FIRE DAMPER DOOR FOR SENSOR LOCATION FOR SERVICE AND MAINTENANCE.
9. INSTALL CONDENSATE DRAIN AND REFRIGERANT PIPING PARALLEL TO THE UNIT AT THE CONNECTION TO ALLOW FOR FRONT AIR FILTER REMOVAL PULL AREA.
10. PROVIDE CONDENSATE DRAIN PIPING WITH TRAP AND AIR BRAKE. REFER TO DETAIL 5, SHEET M6.1.
11. SUPPORT REFRIGERANT PIPING AND CONTROL CONDUIT TO WALL SIMILAR TO DETAIL 5, SHEET M6.2.
12. PROVIDE GALVANIZED STEEL FLOOR SLEEVES AND ROUTE PIPING DOWN TO THE ELECTRICAL ROOM.
13. PROVIDE STAINLESS STEEL WALL SLEEVE AND SEAL SLEEVE TO WALL WATER PROOFING WATER TIGHT. FILL THE ANNULAR SPACE BETWEEN THE PIPING AND THE SLEEVE WITH FOAM AND SEAL THE EXTERIOR WITH ROOF SEALANT LIQUID TIGHT.
14. SUPPORT REFRIGERANT PIPING AND CONDUITS OUTDOORS WITH ACCORDANCE WITH DETAIL 5, SHEET M6.2.
15. INSTALL ACCU ON CONCRETE PAD FOUNDATION 6" ABOVE FINISHED GRADE IN ACCORDANCE WITH DETAIL 8, SHEET M6.1.

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CALALLEN INDEPENDENT SCHOOL DISTRICT

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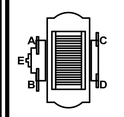
KEY PLAN (NTS)



PLAN NORTH / TRUE NORTH

SHEET NAME
HVAC PLANS - PRESS BOX

SHEET NUMBER
M1.5

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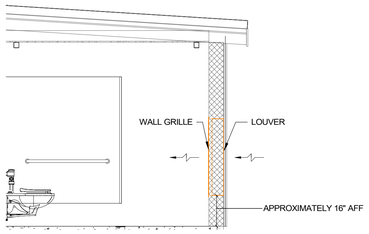
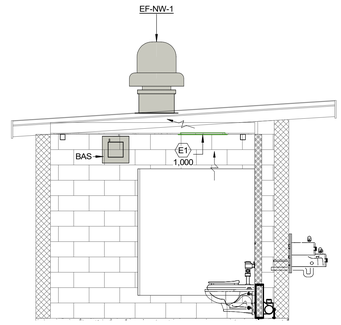
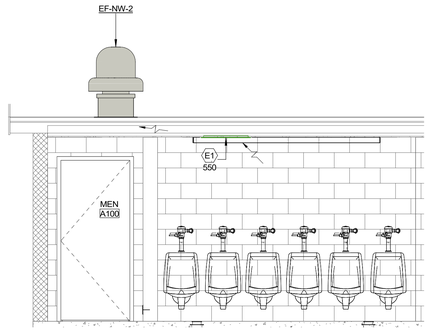


1 HVAC ELEVATION VIEW - INTAKE LOUVER (TYPICAL)
3/8" = 1'-0"



2 HVAC ELEVATION VIEW - EF-NW-1
3/8" = 1'-0"



3 HVAC ELEVATION VIEW - RESTROOM A100 (EF-NW-2)
3/8" = 1'-0"

4 HVAC ELEVATION VIEW - CUSTODIAL B105
3/8" = 1'-0"

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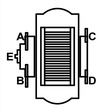

PLAN NORTH
TRUE NORTH

SHEET NAME
HVAC ELEVATION VIEWS - RESTROOMS

SHEET NUMBER

M2.1

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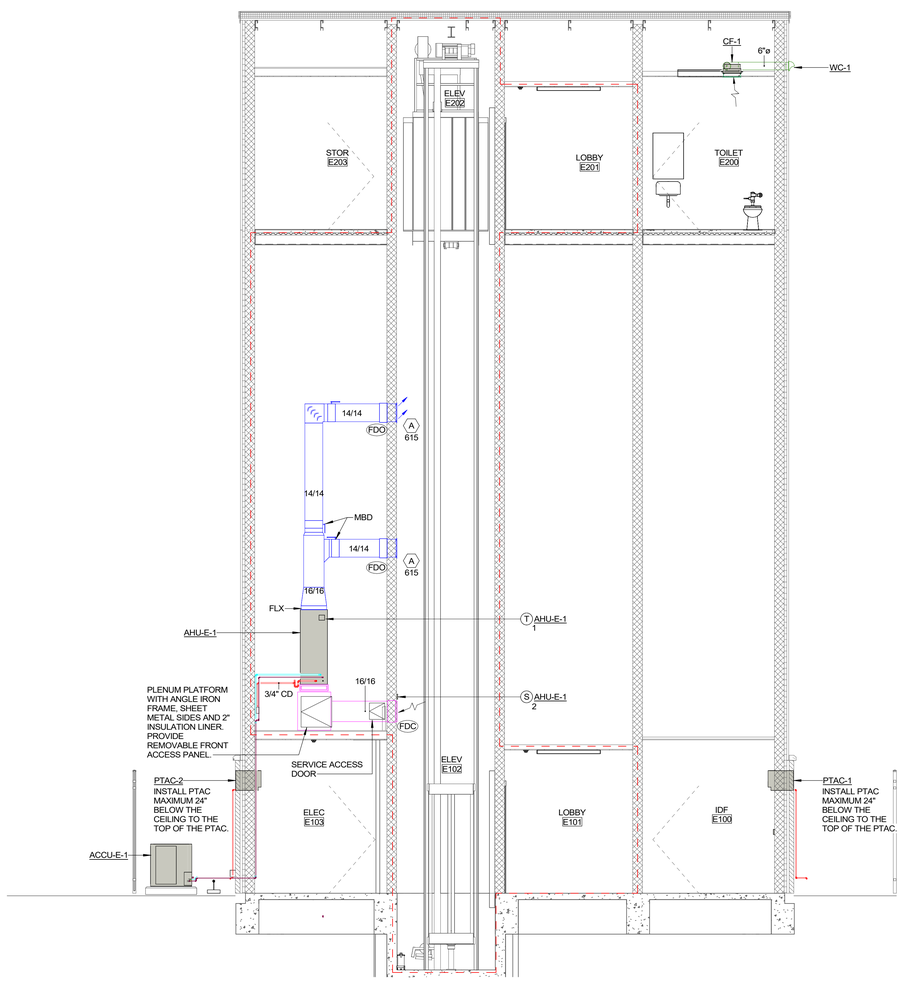
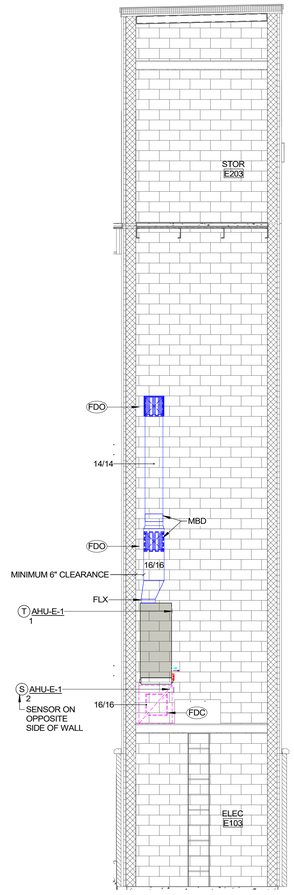
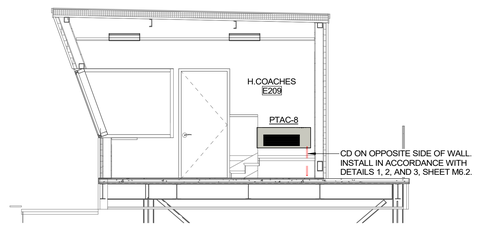


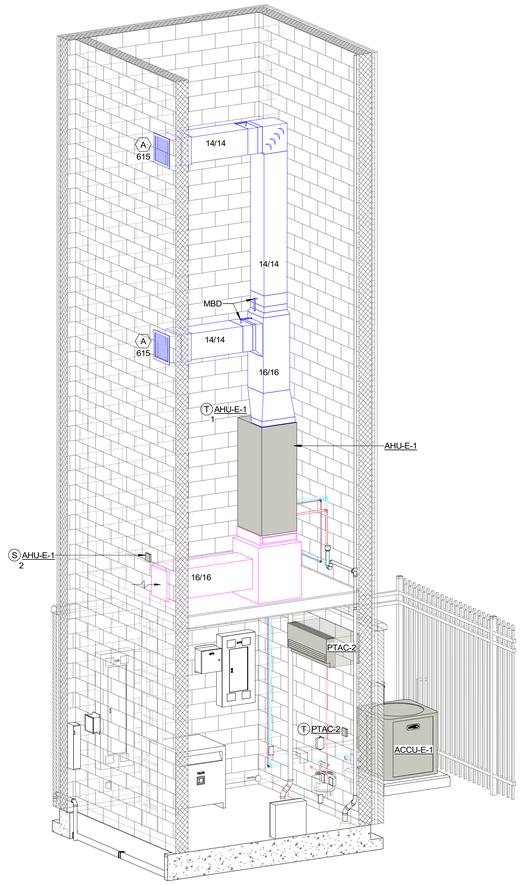
1 HVAC ELEVATION VIEW - ELEVATOR SHAFT AREA
1/4" = 1'-0"



2 HVAC ELEVATION VIEW - ELEVATOR SHAFT WALL
1/4" = 1'-0"



3 HVAC ELEVATION VIEW - COACHES ROOM P213
1/4" = 1'-0"



4 HVAC ISOMETRIC VIEW - PRESS BOX ELEVATOR AREA
NOT TO SCALE

HVAC DRAWING LEGEND

- NEW EQUIPMENT
- NEW SUPPLY DUCTWORK
- NEW EXHAUST DUCTWORK
- OC NEW OCCUPANCY SENSOR
- T NEW THERMOSTAT SENSOR

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Registration # F-006328

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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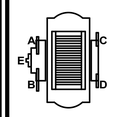
DATE ISSUED:
11/11/2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
HVAC ELEVATION AND ISOMETRIC VIEWS - PRESS BOX

SHEET NUMBER
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LOUVER SCHEDULE

DESIGNATION	APPROX. SIZE WxH	MAX AIR VOLUME CFM	MIN. NET FREE AREA (SQ FT)	MAX PRESS. DROP (IN. WC.)	FUNCTION	**MANUFACTURER & MODEL NO.**	NOTES
L-NE-1	24"x32"	550	2.4	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-NE-2	24"x32"	550	2.4	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-NE-3	18"x16"	120	0.8	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-NW-1	30"x40"	1,000	4.18	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-NW-2	24"x32"	550	2.4	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-SE-1	24"x32"	650	2.4	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-SE-2	24"x32"	550	2.4	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-SE-3	18"x16"	120	0.8	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-SW-1	18"x16"	120	0.8	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-SW-2	30"x40"	1,000	4.18	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-SW-3	24"x32"	650	2.4	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY
L-SW-4	18"x16"	120	0.8	0.0175	INTAKE	RUSKIN EME3625MB	ALL APPLY

NOTES:

1. PROVIDE LOUVERS WITH CONSTRUCTION, ACCESSORIES, AND FINISH AS SPECIFIED.
2. LOUVERS SHALL BE FURNISHED BY HVAC CONTRACTOR FOR INSTALLATION BY GENERAL CONTRACTOR BASED ON DETAILS FURNISHED BY ARCHITECT. ALL LOUVERS SHALL BE MOUNTED AND SECURED IN ACCORDANCE WITH WINDSTORM CODE REQUIREMENTS.

AIR DEVICE SCHEDULE

DESIG.	NECK SIZE	TYPE	SERVICE	DAMPER	MOUNTING	MANUFACTURER & REMARKS
A	14"x14"	REGISTER	SUPPLY	-	SURFACE	TITUS 272 FS, ¾" BLADE SPACING, DOUBLE DEFLECTION, AIR FOIL BLADES, SCREW MOUNT, ALUMINUM CONSTRUCTION, WHITE FINISH
E1	24"x24"	GRILLE	EXHAUST	-	SURFACE	TITUS 3FL, 3/4" BLADE SPACING, 45° FIXED DEFLECTION, ALUMINUM CONSTRUCTION, WHITE FINISH
E2	10"x10"	GRILLE	EXHAUST	-	SURFACE	TITUS 3FL, 3/4" BLADE SPACING, 45° FIXED DEFLECTION, ALUMINUM CONSTRUCTION, WHITE FINISH
T1	18"x16"	GRILLE	TRANSFER	-	SURFACE	TITUS 33R-SS, 3/4" BLADE SPACING, 45° FIXED DEFLECTION, 316 STAINLESS STEEL CONSTRUCTION, BRUSHED FINISH, COUNTERSUNK SCREW HOLES IN FACE FLANGE
T2	24"x32"	GRILLE	TRANSFER	-	SURFACE	TITUS 33R-SS, 3/4" BLADE SPACING, 45° FIXED DEFLECTION, 316 STAINLESS STEEL CONSTRUCTION, BRUSHED FINISH, COUNTERSUNK SCREW HOLES IN FACE FLANGE
T3	30"x40"	GRILLE	TRANSFER	-	SURFACE	TITUS 33R-SS, 3/4" BLADE SPACING, 45° FIXED DEFLECTION, 316 STAINLESS STEEL CONSTRUCTION, BRUSHED FINISH, COUNTERSUNK SCREW HOLES IN FACE FLANGE

NOTES:

1. PROVIDE REMOVABLE CORE ON DIFFUSERS.
2. OBVD- OPPOSED BLADE VOLUME DAMPER FOR AIR DEVICES NOTED ON DRAWINGS OR SCHEDULE AS "OBVD".
3. CONTRACTOR IS RESPONSIBLE TO PROVIDE THE AIR DEVICE FRAME AND MOUNTING SYSTEM TO MATCH THE ARCHITECTURAL CEILING TYPES. SEE ARCHITECTURAL DRAWINGS FOR COORDINATION.
4. PROVIDE SQUARE TO ROUND DUCT ADAPTER AS NEEDED TO CONNECT TO AIR DEVICES.
5. PROVIDE CABLE OPERATED DAMPERS WHERE DAMPERS ARE INSTALLED IN NON-ACCESSIBLE LOCATION.
6. PROVIDE 24"X24" PANEL AIR DEVICES WITH PLASTER FRAME WHEN INSTALLED IN GYPSUM BOARD CEILINGS.
7. ALL DIFFUSERS HAVE 4-WAY PATTERN UNLESS NOTED OTHERWISE ON DRAWINGS OR SCHEDULES.

FIRE DAMPER SCHEDULE

MARK	MANUFACTURER & MODEL NO.	DESCRIPTION
FDC	RUSKIN DIBD20,40,60 STYLE C	CURTAIN TYPE DYNAMIC FIRE DAMPER WITH BLADES AND FRAME OUT OF THE AIR STREAM, 1.5-HR, SLEEVE STYLE C, UL555, ULCS112
FDO	RUSKIN DIBD2/OW	CURTAIN TYPE DYNAMIC FIRE DAMPER WITH BLADES AND FRAME OUT OF THE AIR STREAM, DAMPER OUT OF WALL OR FLOOR, 1.5-HR, SLEEVE STYLE C, UL555 R5531

NOTES:

1. FIRE DAMPERS ARE SELECTED BASED ON PHYSICAL SIZE AND AIR VELOCITY REQUIREMENTS AS DETERMINED BY CURRENT U.L. TESTING PROCEDURES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE EACH INDIVIDUAL FIRE DAMPER INSTALLATION WITH EQUIPMENT MANUFACTURER PROVIDING DAMPERS ON THIS PROJECT TO INSURE THAT INSTALLED DAMPERS AND DAMPER ASSEMBLIES ARE U.L. CERTIFIED AT DESIGN OPERATING CONDITIONS.
2. PROVIDE DUCT ACCESS DOOR FOR EACH FIRE DAMPER. FULL SIZE AS REQUIRED TO SERVICE DAMPER PER NFPA AND U.L. REQUIREMENTS.
3. IF DUCT SIZE REQUIRES MULTIPLE DAMPERS PER U.L. FOR A SINGLE INSTALLATION, CONTRACTOR SHALL INCREASE THE DUCT SIZE AND RESULTING DAMPER 15% LARGER THAN SIZE SHOWN ON DRAWINGS. PROVIDE ALL DUCT TRANSITIONS AS NEEDED TO MEET THIS REQUIREMENT.

FAN SCHEDULE

DESIGNATION	CFM MIN/MAX	ESP IN W.C.	MOTOR NAME PLATE	MOTOR DUTY POWER	V/P/H	RPM MIN/MAX	TYPE	SERVICE	SONES	**MANUFACTURER & MODEL NO.**	CONTROL	NOTES	APPROXIMATE WEIGHT LBS. WITH CURB	SERVICE AREA
CF-1	- / 120	0.30	1.2 A	17 W	115/1/60	943 / -	CD	EXHAUST	2.5	COOK GCVF-180	B	1, 3	25	TOILET P200
EF-NE-1	100 / 550	0.25	1/2 HP	44 W	115/1/60	830 / 1,725	DD	EXHAUST	3.2	COOK ACED-EC 120C17DEC	A, B	1, 2, 5	75	WOMEN R303 & R304
EF-NE-2	100 / 550	0.25	1/2 HP	44 W	115/1/60	830 / 1,725	DD	EXHAUST	3.2	COOK ACED-EC 120C17DEC	A, B	1, 2, 5	75	MEN R301 & R302
EF-NE-3	- / 120	0.25	1/6 HP	11 W	115/1/60	989 / 1,725	DD	EXHAUST	2.4	COOK ACED-EC 90C17DEC	B	1	50	FAMILY R300
EF-NW-1	200 / 1,000	0.25	3/4 HP	89 W	115/1/60	856 / 1,725	DD	EXHAUST	4.9	COOK ACED-EC 135C17DEC	A, B	1, 2, 5	75	WOMEN R101 & R102
EF-NW-2	100 / 550	0.25	1/2 HP	44 W	115/1/60	830 / 1,725	DD	EXHAUST	3.2	COOK ACED-EC 120C17DEC	A, B	1, 2, 5	75	MEN R100
EF-SE-1	130 / 650	0.25	1/2 HP	53 W	115/1/60	892 / 1,725	DD	EXHAUST	3.9	COOK ACED-EC 120C17DEC	A, B	1, 2, 5	75	WOMEN R403 & R404
EF-SE-2	100 / 550	0.25	1/2 HP	44 W	115/1/60	830 / 1,725	DD	EXHAUST	3.2	COOK ACED-EC 120C17DEC	A, B	1, 2, 5	75	MEN R401 & R402
EF-SE-3	- / 120	0.25	1/6 HP	11 W	115/1/60	989 / 1,725	DD	EXHAUST	2.4	COOK ACED-EC 90C17DEC	A	1, 4	50	CUSTODIAL R400
EF-SW-1	- / 120	0.25	1/6 HP	11 W	115/1/60	989 / 1,725	DD	EXHAUST	2.4	COOK ACED-EC 90C17DEC	A	1, 4	50	CUSTODIAL R205
EF-SW-2	200 / 1,000	0.25	3/4 HP	89 W	115/1/60	856 / 1,725	DD	EXHAUST	4.9	COOK ACED-EC 135C17DEC	A, B	1, 2, 5	75	WOMEN R203 & R204
EF-SW-3	130 / 650	0.25	1/2 HP	53 W	115/1/60	892 / 1,725	DD	EXHAUST	3.9	COOK ACED-EC 120C17DEC	A, B	1, 2, 5	75	MEN R201 & R202
EF-SW-4	- / 120	0.25	1/6 HP	11 W	115/1/60	989 / 1,725	DD	EXHAUST	2.4	COOK ACED-EC 90C17DEC	B	1	50	FAMILY R200

* REFER TO SPECIFICATION FOR EQUIPMENT REQUIREMENTS
** FIELD VERIFY EXISTING CONDITIONS

NOTES:

1. PROVIDE WITH SINGLE POINT POWER CONNECTION AND INTEGRAL ELECTRICAL DISCONNECT SWITCH.
2. PROVIDE WITH EC FAN MOTOR CONTROLLER WITH 2-SPEED FAN CONTROL MODULE COOK MODEL NUMBER VARI-FLOW VF2SC OR EQUAL. REMOTE MOUNT IN SPACE MOUNTED CONTROL PANEL.
3. PROVIDE WITH PLASTIC CEILING INLET GRILLE.
4. PROVIDE WITH HIGH VOLTAGE THERMOSTAT JOHNSTON SUPPLY # L45-665, PECO#TF115-001, 40-100 F RANGE, SPDT, 3 F DIFF, 16 FLA @120 V.
5. PROVIDE WITH REMOTE PROBE THERMOSTAT, JOPHNSTON SUPPLY # L36-931, JOHNSON CONTROLS #A19ABC-24C, -30-100 F RANGE, SPDT, 3-12 F DIFF, REMOTE SENSING BULB.

GENERAL NOTES: (APPLICABLE TO ALL FAN'S)

A. MAINTAIN MANUFACTURER'S RECOMMENDED DISTANCES FOR MAINTENANCE.
B. MAINTAIN 10' MINIMUM CLEARANCE BETWEEN O/A AND EXHAUST AIR.
C. EC: DIGITAL ELECTRONICALLY COMMUTATED MOTOR
D. PSC: PERMANENT SPLIT CAPACITOR MOTOR

CONTROL:

A - THERMOSTAT CONTROL
B - OCCUPANCY SENSOR

TYPE:

DD - DOWNBLAST CENTRIFUGAL ROOF EXHAUSTER - DIRECT DRIVE
ID- IN-LINE CENTRIFUGAL FAN - DIRECT DRIVE
CD - CABINET EXHAUSTER - DIRECT DRIVE

PACKAGED TERMINAL AIR CONDITIONING UNIT SCHEDULE

DESIGNATION	COOLING CAPACITY (NOMINAL) BTUH	COOLING FLA	EER	S/A CFM L/H	VENT. AIR CFM	HEATING ELEC. KW	HEATING (A)	ELECTRIC V/P/H	MOCP	RECEPTACLE	SERVICE AREA	MANUFACTURER & MODEL NO.
PTAC-1	15,000	6.70	10.9	320/360	-	1.635	7.87	208/1/60	15	NEMA 6-15R	IDF	ISLANDAIRE EZ4216K9201N46AA
PTAC-2	9,000	3.7	12.7	290/340	-	1.635	7.87	208/1/60	15	NEMA 6-15R	ELEC	ISLANDAIRE EZ4209K9201N46AA
PTAC-3	15,000	6.70	10.9	320/360	30	4.09	19.66	208/1/60	30	NEMA 6-30R	V. COACHES	ISLANDAIRE EZ4216K341N46AA
PTAC-4	12,000	5.20	12.0	320/340	30	2.78	13.37	208/1/60	20	NEMA 6-20R	ANNOUNCERS	ISLANDAIRE EZ4212K231N46AA
PTAC-5	12,000	5.20	12.0	320/340	30	2.78	13.37	208/1/60	20	NEMA 6-20R	SCOREBOARD	ISLANDAIRE EZ4212K231N46AA
PTAC-6	12,000	5.20	12.0	320/340	30	2.78	13.37	208/1/60	20	NEMA 6-20R	RADIO	ISLANDAIRE EZ4212K231N46AA
PTAC-7	12,000	6.44	10.7	240/360	30	2.78	13.37	208/1/60	20	NEMA 6-20R	VIDEO	ISLANDAIRE EZDR121231N46AA
PTAC-8	15,000	6.70	10.9	320/360	30	4.09	19.66	208/1/60	30	NEMA 6-30R	H. COACHES	ISLANDAIRE EZ4216K341N46AA

ALL NOTES APPLY:

1. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
2. PROVIDE MANUFACTURER'S WALL SLEEVE WITH FLUSH ALUMINUM REAR WALL LOUVER.
3. PROVIDE WIRED REMOTE 7-DAY PROGRAMMABLE AUTOMATIC CHANGEOVER THERMOSTAT. REFER TO FLOOR PLAN DRAWING FOR LOCATION. VERDANT WITH IR OCCUPANCY SENSOR.
4. PROVIDE EXTERNAL CONDENSATE REMOVAL KIT FOR EXTERNAL DRAIN PIPE CONNECTION.
5. PROVIDE CONDITIONED MAKE-UP AIR SECTION WITH SEPARATE DEHUMIDIFIER COMPRESSOR FOR MODEL #DR.
6. PROVIDE WITH POWER CORD AND END CAP.
7. PROVIDE WITH EXTREME SEACOAST COATING FOR BOTH THE WALL SLEEVE AND PTAC EQUIPMENT COMPONENTS.

CONDENSING UNIT SCHEDULE

DESIGNATION	AIR ON CONDENSOR (°F)	COOLING TOTAL CAP MBTUH @AHRI	SEER2 @AHRI	ELECTRICAL DATA V/P/H	COMPRESSORS QTY.	COMPRESSORS STAGES	COMPRESSORS RLA	FANS QTY.	FANS RLA	MCA	MOCP	**MANUFACTURER & MODEL NO.**	WEIGHT (LBS)	REFRIGERANT PIPING LIQUID PIPE QTY.	LIQUID PIPE SIZE(O.D.)	SUCTION PIPE QTY.	SUCTION PIPE SIZE(O.D.)
ACCU-E-1	105	35.000	16.0	208/1/60	1	2	14.6	1	0.74	19	30	LENNOX ML17KC2-036-230	206	1	3/8 "	1	7/8"

NOTES: (APPLICABLE TO ALL ACCU'S)

1. REFRIGERANT R-454B.
2. REFRIGERANT PIPE SIZES SHOWN ARE FOR REFERENCE PURPOSES ONLY. CONFIRM EXACT SIZES WITH MANUFACTURER AND ADJUST AS NECESSARY. COMPLETE REFRIGERANT PIPING INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. PROVIDE SINGLE POINT POWER CONNECTION.
4. PROVIDE TWO STAGE UNLOADING TYPE SCROLL COMPRESSOR AND TWO STAGE ELECTRONIC COOLING CONTROL BOARD.
5. PROVIDE REFRIGERANT SIGHT GLASS AND FILTER DRIER UPSTREAM OF INDOOR COOLING COIL BEFORE THERMAL EXPANSION VALVE. PROVIDE SIGHT GLASS NEAR REFRIGERANT PIPE CONNECTION TO ACCU. SIGHT GLASS INSTALLED OUTDOORS MUST BE CONSTRUCTED OF COPPER, BRASS, OR OTHER NON-FERROUS MATERIAL.
7. PROVIDE WITH CONDENSER FAN LOW AMBIENT FAN CONTROL.
8. PROVIDE HIGH AND LOW REFRIGERANT PRESSURE SAFETY SWITCHES.
9. PROVIDE COMPRESSOR CRANK CASE HEATER.
10. PROVIDE LOUVERED HAIL GUARDS OVER CONDENSER COILS.
11. MAINTAIN MANUFACTURER'S RECOMMENDED DISTANCE FOR MAINTENANCE.
12. PROVIDE WITH WINDSTORM GROUND MOUNTING KIT.

WALL CAP SCHEDULE

DESIGNATION	CONNECTION SIZE (INCHES)	SERVICE TYPE	MANUFACTURER & MODEL NO.	SERVICE AREA
WC-1	6" ROUND	EXHAUST	SEIHO SFB-6PH	PRESS BOX RESTROOM

NOTES:

1. ALL ALUMINUM CONSTRUCTION, ANODIZED FINISH.
2. PROVIDE ALUMINUM BACKDRAFT DAMPER.

SYMBOLS AND ABBREVIATIONS

GATE VALVE
GLOBE VALVE
BUTTERFLY VALVE
PLUG VALVE
CONTROL VALVE, TWO WAY
CONTROL VALVE, THREE WAY
ANGLE GATE VALVE
ANGLE GLOBE VALVE
HOSE END GATE VALVE
CHECK VALVE
PRESSURE-RELIEF VALVE
ECCENTRIC REDUCER
CONCENTRIC REDUCER
TEE UP, TEE DOWN
ELBOW UP, ELBOW DOWN
UNION
FLEXIBLE PIPE CONNECTION
STRAINER WITH BLOW-OFF
THERMOMETER WITH WELL
THERMOMETER WELL ONLY
GAUGE COCK ONLY
EXPANSION JOINT
AUTOMATIC AIR VENT
ORIFICE FLANGE
VENTURI FLOW TUBE
F.S. FLOW SWITCH
H HUMIDISTAT
T THERMOSTAT (SUBSCRIPT IDENTIFIES ZONE)
S SENSOR
OC OCCUPANCY SENSOR
FLEXIBLE DUCT CONNECTION
RECTANGULAR DUCT ELBOW WITH TURNING VANES
SUPPLY DUCT UP OR DOWN
O/A SUPPLY DUCT UP OR DOWN
RETURN DUCT UP OR DOWN
EXHAUST DUCT UP OR DOWN
12/10 OR 12 / 10 DUCT SIZE, (FIRST OR TOP NO. INDICATES SIDE FACING VIEWER)

A.P. OR A.P. DUCT ACCESS PANEL

AAV	AUTOMATIC AIR VENT
AHU	AIR HANDLING UNIT
RTU	ROOFTOP UNIT
OARTU	OUTSIDE AIR ROOFTOP UNIT
D	DRAIN PIPING
NG	NATURAL GAS PIPING
E	REFRIGERANT EQUALIZER PIPING
HG	REFRIGERANT DISCHARGE (HOT GAS) PIPING
RL	REFRIGERANT LIQUID PIPING
RS	REFRIGERANT SUCTION PIPING
CD	CONDENSATE PIPING
CO	CLEANOUT
DS	DOOR SWITCH
EF	EXHAUST FAN
ER	EXHAUST REGISTER
FCU	FAN AND COIL UNIT
GRV	GRAVITY ROOF VENTILATOR
O/A	OUTSIDE AIR
SF	SUPPLY FAN
SG	SUPPLY GRILLE
SR	SUPPLY REGISTER
VFD	VARIABLE FREQUENCY MOTOR SPEED CONTROLLER
MUF	MAKEUP AIR FAN
OAM/DS	OUTSIDE AIR MONITOR / DAMPER SENSOR
4.0	ORIFICE PLATE SIZE
U.G.	UNDER GROUND
FLX	FLEXIBLE DUCT OR PIPE CONNECTION
BAS	BUILDING AUTOMATION SYSTEM
BFP	BACKFLOW PREVENTER
RH	ROOF HOOD
EC	ELECTRONICALLY COMMUTATED MOTOR
AC-VFD	A/C MOTOR WITH VARIABLE FREQUENCY DRIVE
EDH	ELECTRIC DUCT HEATER
S.S.	STAINLESS STEEL
DP	DIFFERENTIAL PRESSURE

M MOTORIZED MULTI-LEAF VOLUME DAMPER
MANUAL MULTI-LEAF VOLUME DAMPER WITH LOCKING QUADRANT
FD FIRE DAMPER WITH FUSIBLE LINK

* THIS IS A GENERAL LEGEND. ALL SYMBOLS AND ABBREVIATIONS MAY NOT APPLY TO THIS PROJECT.

MECHANICAL GENERAL NOTES

1. THESE GENERAL NOTES APPLY TO ALL HVAC DRAWINGS.
2. DUCT SIZES ARE INSIDE CLEAR DIMENSIONS. ADJUST AS NECESSARY TO ALLOW FOR LINER.
3. INSULATE ALL DUCTWORK IN ACCORDANCE WITH SPECIFICATIONS.
4. PROVIDE FLEXIBLE CONNECTION AT DUCT ATTACHMENTS TO EQUIPMENT AS INDICATED ON DRAWINGS.
5. HVAC EQUIPMENT SUBMITTED OTHER THAN SCHEDULED MANUFACTURER'S SHALL NOT EXCEED PHYSICAL DIMENSIONS DUE TO SPACE LIMITATIONS.
6. ALL PIPING AND DUCTWORK PENETRATIONS OF FIRE-RATED BARRIERS SHALL BE PROTECTED WITH FIRE BLOCKING MATERIAL PER SPECIFICATIONS.
7. MANUAL VOLUME DAMPERS INSTALLED IN RECTANGULAR DUCTWORK SHALL BE OPPOSED BLADE TYPE. MANUAL VOLUME DAMPERS INSTALLED IN ROUND DUCTWORK SHALL BE BUTTERFLY TYPE.
8. BALANCING DAMPERS IN EXTERNALLY INSULATED DUCTWORK SHALL BE PROVIDED WITH A BUILD-OUT ON DAMPER OPERATOR TO EXTEND OPERATOR HANDLE TO OUTSIDE OF INSULATION.
9. CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID AND DETERMINE ALL EXISTING CONDITIONS WHICH MAY AFFECT HIS WORK. ANY CONDITIONS RESULTING IN ADDITIONAL WORK ARISING AFTER AWARD OF CONTRACT AND START OF CONSTRUCTION WHICH COULD HAVE BEEN AVOIDED AND/OR RESOLVED HAD THE CONTRACTOR VISITED THE SITE AND OBSERVED EXISTING CONDITIONS SHALL BE PERFORMED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER.
10. IT IS THE INTENT OF THESE CONTRACT DOCUMENTS TO PROVIDE COMPLETE, PROPERLY ADJUSTED AND OPERABLE MECHANICAL SYSTEMS. PROVIDE ALL NECESSARY SUPERVISION, COORDINATION, LABOR, MATERIALS, EQUIPMENT, FIXTURES, DRAYAGE, HOISTING, TOOLS, MACHINERY AND CONNECTIONS TO UTILITIES FOR THE INSTALLATION OF COMPLETE AND OPERABLE MECHANICAL SYSTEMS. IF DETAILS OR SPECIAL CONDITIONS ARE REQUIRED IN ADDITION TO THOSE SHOWN ON DRAWINGS, PROVIDE ALL MATERIAL AND EQUIPMENT REQUIRED TO COMPLETE THEIR INSTALLATION, WHETHER NOTED IN PLANS OR NOT.
11. MECHANICAL AND ELECTRICAL CONTRACTORS SHALL COORDINATE TO ENSURE CORRECT ELECTRICAL SERVICE TO MECHANICAL EQUIPMENT. COORDINATION SHALL PRECEDE PURCHASE OF EQUIPMENT. IMMEDIATELY REPORT ALL DISCREPANCIES TO THE OWNER'S REPRESENTATIVE. ALL DISCREPANCIES FOUND AFTER THE PURCHASE OR INSTALLATION OF EQUIPMENT SHALL BE REMEDIED BY THE CONTRACTOR AT NO COST TO THE OWNER OR DESIGN PROFESSIONALS.
12. CONTRACTOR SHALL MAKE HIMSELF FAMILIAR WITH OTHER TRADES WHICH DIRECTLY AFFECT CONTRACTOR'S SCOPE OF WORK.
13. ALL HOLES IN CONCRETE, MASONRY, AND PLASTER SHALL BE CORE DRILLED WHEN POSSIBLE. VERIFY STRUCTURE BEFORE DRILLING. DO NOT CUT STRUCTURE OR STRUCTURAL REINFORCEMENT. IMMEDIATELY REPORT ANY DAMAGE CAUSED BY DRILLING TO THE OWNER'S REPRESENTATIVE.
14. ANY DAMAGE TO BUILDING STRUCTURE SHALL BE PATCHED TO THE COMPLETE SATISFACTION OF THE OWNER'S REPRESENTATIVE.
15. CONTRACT DRAWINGS ARE DIAGRAMMATIC IN NATURE. FIELD VERIFY EXACT DIMENSIONS AND LOCATIONS OF WALLS, DOORS, AND OTHER BUILDING STRUCTURE FROM FIELD MEASUREMENTS AND LOCATE EQUIPMENT, DUCTS, PIPING, FIXTURES, ETC., AS REQUIRED AND NECESSARY. IF CHANGES FROM PLANS ARE REQUIRED, PROVIDE SKETCH TO OWNER'S REPRESENTATIVE SHOWING CHANGES FOR APPROVAL. ALTERATIONS TO THE ROUTING OF PIPING, DUCT, ETC., OR LOCATION OF EQUIPMENT, FIXTURES, ETC., SHALL BE WITHOUT COST TO THE OWNER OR DESIGN PROFESSIONALS.
16. ADJUSTMENT OF MECHANICAL EQUIPMENT, DUCT WORK, AND PIPING MAY BE NECESSARY TO FIT FIELD CONDITIONS. COORDINATE WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS AND OTHER TRADES. SUCH WORK SHALL BE COMPLETED AT NO COST TO THE OWNER OR DESIGN PROFESSIONALS.
17. COORDINATE ALL CEILING MOUNTED AIR DISTRIBUTION DEVICE LOCATIONS WITH CEILING PLANS.

DEFINITIONS

"PROVIDE" SHALL MEAN FURNISHED AND INSTALLED, COMPLETE AND READY FOR INTENDED USE BY CONTRACTOR, EXCEPT AS OTHERWISE NOTED.

"FURNISH" SHALL MEAN PURCHASE ONLY BY CONTRACTOR; INSTALLATION BY OTHERS, EXCEPT AS OTHERWISE NOTED.

"INSTALL" SHALL MEAN CONTRACTOR TO SET UP FOR USE, ERECT OR CONSTRUCT ONLY; PURCHASE BY OTHERS, EXCEPT AS OTHERWISE NOTED.

"DEMOLISH" AND "REMOVE" SHALL MEAN CONTRACTOR TO DISASSEMBLE, TAKE AWAY FROM SITE, AND PROPERLY DISPOSE OF ITEMS AS INDICATED OR IMPLIED EXCEPT AS OTHERWISE NOTED. CONTRACTOR SHALL PATCH REMAINING SYSTEMS TO MATCH EXISTING.

CODE REVIEW

1. 2021 INTERNATIONAL MECHANICAL CODE
2. 2015 INTERNATIONAL ENERGY CONSERVATION CODE - PRESCRIPTIVE COMPLIANCE PATH

AIR HANDLING UNIT SCHEDULE

DESIGNATION	FAN SECTION SUPPLY CFM STAGE 1 COOL	SUPPLY CFM STAGE 2 COOL	FAN HP HP/BHP	V/P/H	ESP IN. WG	DX COOLING COIL ROWS	FPI	COIL FACE AREA (SQ.FT.)	ENTERING AIR °F DB/°F WB	LEAVING AIR °F DB/°F WB	GROSS SENSIBLE CAPACITY MBTUH	GROSS TOTAL CAPACITY MBTUH	ELECTRIC HEAT EDB / LDB °F	K.W.	CAPACITY MBTUH	NO. OF STAGES	V/P/H	EXTERNAL FILTER SECTION MANUFACTURER & MODEL NO.	NUMBER OF FILTERS	FILTER SIZE (INCHES)	FILTER TYPE	M.E.R.V.	UNIT DIMENSIONS LENGTH	WIDTH	HEIGHT	ELECTRICAL DATA MCA	MOCP	LENNOX MODEL NO.	SERVICE AREA	NOTES
AHU-E-1	860	1,230	0.5/-	208/1/60	0.75	3	14	5.0	75.0/64.0	54.3/54.2	27.100	35.000	68/85.4	9.0	23.100	2	208/1/60	McDANIEL METALS ACE 2020-6	1	20x20x4	EXTENDED PLEATED	8	22-5/8"	21-1/4"	58-1/2"	47	50	CBK48MVT-036	ELEVATOR AREA	ALL APPLY

NOTES: (NOTES APPLICABLE TO ALL AHU's)

1. VERTICAL DRAW THROUGH AIR HANDLING UNIT.
2. VARIABLE SPEED ECM DIRECT DRIVE FORWARD CURVED FAN.
3. SINGLE CIRCUIT COOLING COIL WITH HARD SHUTOFF NON-BLEED TXV SUITABLE FOR USE WITH R-454B OR R-32 REFRIGERANT.TWO STAGE COOLING OPERATION.
4. PVC IAQ DRAIN PAN.
5. INSULATED CASING WITH MINIMUM R=4.2 LINER.
6. PROVIDE SERVICE ACCESS DOORS WITH AIR TIGHT SEAL.
8. PROVIDE INTEGRAL FACTORY INSTALLED AND WIRED CONTROLS: FAN ECM CONTROL, TWO-STAGE COOLING CONTROL, LOW VOLTAGE TRANSFORMER, CONTROL WIRING TERMINAL STRIP AND ELECTRIC HEAT CONTROLS.
9. PROVIDE FILTER SUB-BASE WITH FIBERGLASS INSULATION LINER.
10. MAINTAIN MANUFACTURER'S RECOMMENDED DISTANCE FOR MAINTENANCE.
11. SINGLE POINT POWER CONNECTION WITH INTEGRAL CIRCUIT BREAKER TYPE ELECTRICAL DISCONNECT SWITCH PER NEC.
12. PROVIDE HEAVY GAGE SHEET METAL ADAPTER PLATE ON TOP OF THE EXTERNAL AIR FILTER AS NEEDED TO ADAPT TO AHU EQUIPMENT BASE CONNECTION.

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALLALEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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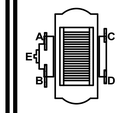
DATE ISSUED:
11/11/2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
HVAC SCHEDULES

SHEET NUMBER
M5.1

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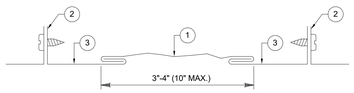
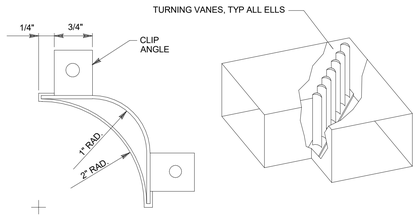
KEYED NOTES:

1. FIRE RESISTANT RUBBER IMPREGNATED FABRIC.
2. TDF DUCT FLANGE WITH CLEATS AND SECURING HARDWARE.
3. MINIMUM 20 U.S. GAUGE STEEL TO MATCH ADJOINING DUCT CONSTRUCTION; GALVANIZED OR 316 STAINLESS STEEL AS APPLICABLE.



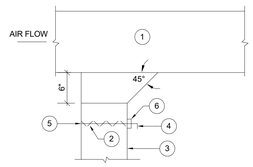
1 DETAIL - FLEXIBLE DUCT CONNECTION
SCALE: NOT TO SCALE



2 DETAIL - TURNING VANES
SCALE: NOT TO SCALE

KEYED NOTES:

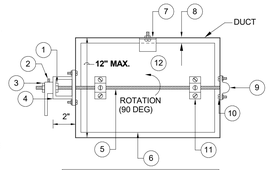
1. MAIN TRUNK DUCT.
2. MANUAL OPPOSED BLADE DAMPER.
3. BRANCH DUCT.
4. STAND-OFF WITH LOCKING QUADRANT.
5. AIR TIGHT END CAP/BEARING.
6. INSULATE BEHIND HANDLE WITH EXTERNALLY INSULATED DUCT SYSTEMS.



3 DETAIL - BRANCH DUCT CONNECTION
SCALE: NOT TO SCALE

KEYED NOTES: 10/M501

1. ROD POSITIONING NUT HANDLE WITH SET SCREW.
2. ALIGN HANDLE WITH DAMPER BLADE. ENSURE THAT FULL 90° DAMPER BLADE MOVEMENT IS UNOBSTRUCTED.
3. BLADE POSITION LOCKNUT.
4. MINIMUM 2" STAND-OFF BRACKET, BOLT TO DUCT.
5. 3/8" DIA. THREADED ROD.
6. 16 GA. STEEL BLADE.
7. STEEL ANGLE BLADE STOP, BOLT TO DUCT.
8. 1/4" CLEARANCE ALL-AROUND.
9. BEARING FITTING, BOLT TO DUCT, SEAL AIR TIGHT.
10. ENSURE BOLTS CLEAR BLADE, OR INSTALL THEM IN OPPOSING CORNERS AWAY FROM BLADE ROTATION.
11. STEEL CLAMP, BOLT TO BLADE. PROVIDE AN ADDITIONAL ANTI-SLIP BOLT THROUGH THE ROD, (TYPICAL)
12. FOR DUCT HEIGHTS MORE THAN 12", PROVIDE FACTORY-FABRICATED OPPOSED BLADE DAMPERS.

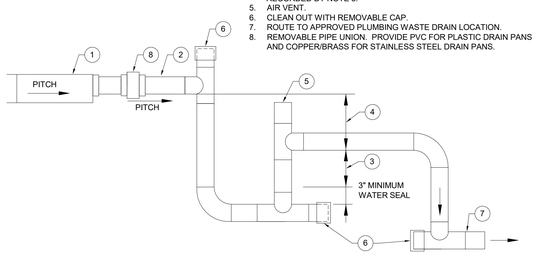


NOTE: DAMPERS SHALL BE SIMILAR FOR EQUIVALENT ROUND.

4 DETAIL - MANUAL BALANCING DAMPER (MBD)
SCALE: NOT TO SALE

KEYED NOTES:

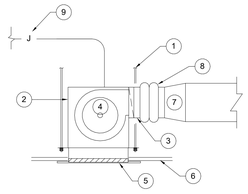
1. CONDENSATE DRAIN PAN.
2. DRAIN PIPE. SIZE AS SHOWN ON DRAWING OR PER MANUFACTURER'S RECOMMENDATIONS.
3. THIS DIMENSION MUST BE GREATER THAN STATIC PRESSURE MEASURED AT DRAIN PAN POSITIVE OR NEGATIVE (IN. W.G.)
4. THIS DIMENSION MUST BE GREATER THAN 1.5 PRESSURE RECORDED BY NOTE 3.
5. AIR VENT.
6. CLEAN OUT WITH REMOVABLE CAP.
7. ROUTE TO APPROVED PLUMBING WASTE DRAIN LOCATION.
8. REMOVABLE PIPE UNION. PROVIDE PVC FOR PLASTIC DRAIN PANS AND COPPER/BRASS FOR STAINLESS STEEL DRAIN PANS.



5 DETAIL - CONDENSATE DRAIN TRAP
SCALE: NOT TO SCALE

KEYED NOTES:

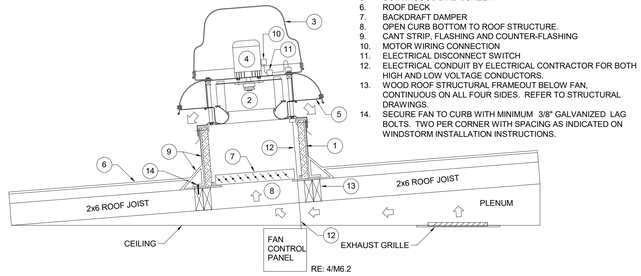
1. SUPPORT FROM STRUCTURE ABOVE, MINIMUM FOUR 5/16" DIA. THRD. STEEL RODS. (TYPICAL)
2. CABINET FAN WITH ACOUSTICALLY INSULATED HOUSING.
3. BACKDRAFT DAMPER.
4. FAN SPEED CONTROLLER BUILT INTO FAN MOTOR.
5. INLET GRILLE.
6. CEILING AS APPLICABLE.
7. TRANSITION TO EQUIPMENT DUCT CONNECTION SIZE.
8. PROVIDE FLEXIBLE DUCT CONNECTION.
9. ELECTRICAL POWER JUNCTION BOX PROVIDED BY ELECTRICAL CONTRACTOR WITH HIGH VOLTAGE CONNECTION TO FAN.



6 DETAIL - SUSPENDED CABINET EXHAUST FAN
SCALE: NOT TO SCALE

KEYED NOTES:

1. FACTORY FABRICATED INSULATED ROOF CURB TO MATCH SLOPE AND CONSTRUCTION OF ROOF.
2. CENTRIFUGAL FAN
3. REMOVABLE WEATHERPROOF HOUSING
4. FAN MOTOR WITH VIBRATION ISOLATORS
5. CONTINUOUS BIRD SCREEN
6. ROOF DECK
7. BACKDRAFT DAMPER
8. OPEN CURB BOTTOM TO ROOF STRUCTURE.
9. CANT STRIP, FLASHING AND COUNTER-FLASHING
10. MOTOR WIRING CONNECTION
11. ELECTRICAL DISCONNECT SWITCH
12. ELECTRICAL CONDUIT BY ELECTRICAL CONTRACTOR FOR BOTH HIGH AND LOW VOLTAGE CONDUCTORS.
13. WOOD ROOF STRUCTURAL FRAMEOUT BELOW FAN, CONTINUOUS ON ALL FOUR SIDES. REFER TO STRUCTURAL DRAWINGS.
14. SECURE FAN TO CURB WITH MINIMUM 3/8" GALVANIZED LAG BOLTS. TWO PER CORNER WITH SPACING AS INDICATED ON WINDSTORM INSTALLATION INSTRUCTIONS.



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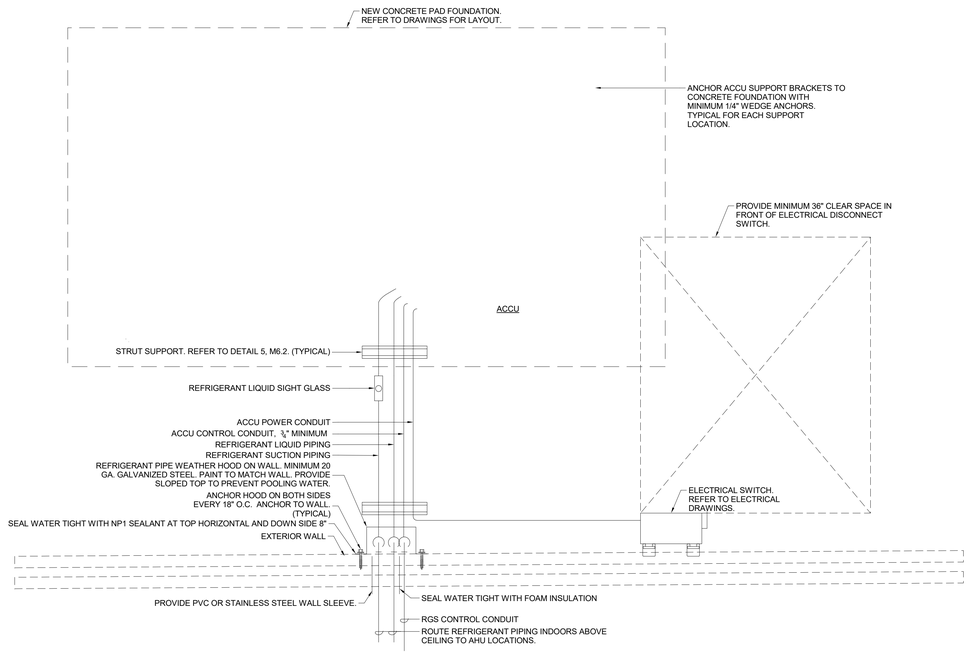
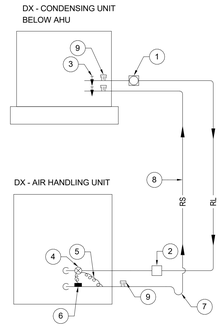
7 DETAIL - ROOF MOUNTED RESTROOM FAN
SCALE: NOT TO SCALE



8 DETAIL - GROUND MOUNTED CONDENSING UNIT
SCALE: NOT TO SCALE



KEYED NOTES:

1. COMBINATION SIGHT GLASS AND MOISTURE INDICATOR.
2. PERMANENT TYPE REFRIGERANT FILTER DRYER. LOCATE INDOORS. (TYPICAL)
3. REFRIGERANT SHUTT-OFF VALVE. (TYPICAL)
4. THERMAL EXPANSION VALVE. (TYPICAL)
5. TXV EQUALIZER PIPE.(TYPICAL)
6. TXV THERMAL BULB. CLAMP SECURE TO SUCTION PIPE WITH STAINLESS STEEL OR COPPER CLAMP. INSULATE OVER THERMAL BULB. (TYPICAL)
7. INSTALL OIL TRAP AS REQUIRED BY EQUIPMENT MANUFACTURER. (TYPICAL)
8. INSULATE SUCTION PIPING. REFER TO SPECIFICATIONS.
9. REFRIGERANT GAUGE SERVICE VALVE.

9 DETAIL - REFRIGERANT PIPING DIAGRAM
SCALE: NOT TO SCALE

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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DATE ISSUED:
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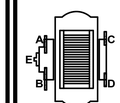
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
HVAC DETAILS

SHEET NUMBER
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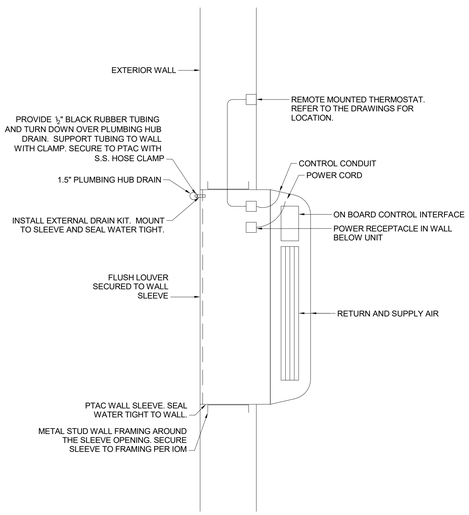
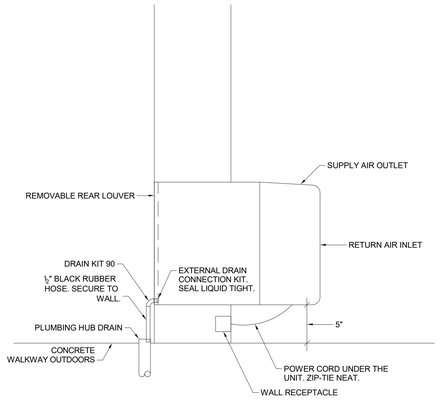
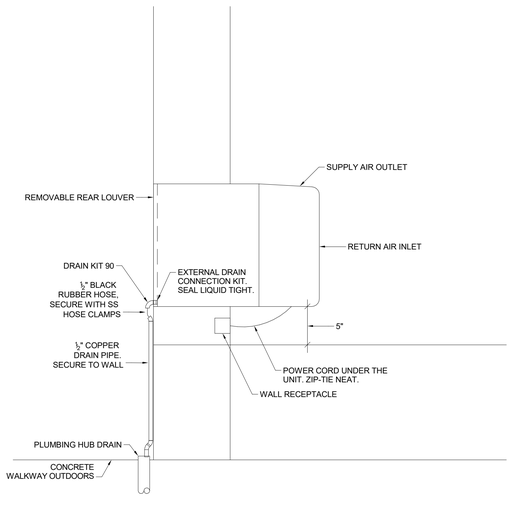


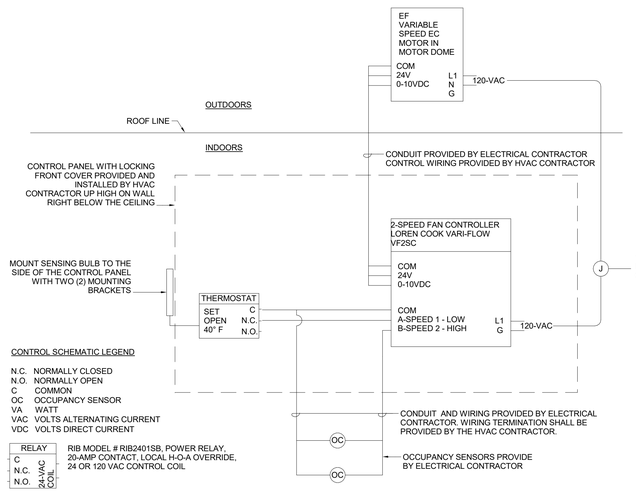
1 DETAIL - PTAC PLAN VIEW PRESS AREA
SCALE: 1" = 1'-0"



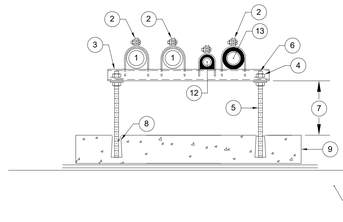
2 DETAIL - PTAC SECTION VIEW PRESS AREA (LOW UNIT)
SCALE: 1-1/2" = 1'-0"



3 DETAIL - PTAC SECTION VIEW PRESS AREA (HIGH UNIT)
SCALE: 1-1/2" = 1'-0"



4 DETAIL - RESTROOM FAN CONTROL PANEL SCHEMATIC
SCALE: NOT TO SCALE



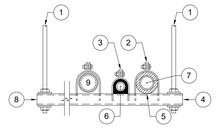
GENERAL NOTES:

1. ALL STEEL COMPONENTS SHALL HAVE GALVANIZED FINISH.
2. SPRAY ALL CUT ENDS WITH COLD GALVANIZING COMPOUND.

KEYED NOTES:

1. OUTDOOR CONDUIT, POWER OR CONTROL. QUANTITY AND SIZE VARIES. (TYPICAL)
2. STEEL STRUT PIPE CLAMP, B-LINE SERIES 2000.
3. 1-5/8" STEEL STRUT CHANNEL. LENGTH AS NEEDED PER APPLICATION.
4. WASHER AND NUT. (TYPICAL)
5. 3/8" DIA. THREADED ROD.
6. CUT EXCESS ROD AT PROJECT COMPLETION.
7. PROVIDE HEIGHT AS NEEDED.
8. DROP IN EXPANSION ANCHOR. IMBED MINIMUM 2" INTO CONCRETE PAD.
9. MINIMUM 14"x14"x4", 3000 PSI CONCRETE PAD.
10. NOTE NOT USED.
11. GROUND.
12. REFRIGERANT LIQUID PIPING WITH B-LINE SERIES BVT VIBRACLAMP. (TYPICAL)
13. INSULATED REFRIGERANT SUCTION PIPING.

5 DETAIL - GROUND OR ROOF PIPE SUPPORT
SCALE: NOT TO SCALE



KEYED NOTES:

1. 3/8" DIA. GALVANIZED HANGER ROD. FASTEN TO STRUCTURE ABOVE (TYPICAL FOR EACH END).
2. B-LINE SERIES B2000 O.D. TUBING CLAMP (TYPICAL).
3. B-LINE SERIES BVT VIBRACLAMP (TYPICAL).
4. B-LINE B32 1-5/8" GALVANIZED STRUT.
5. 18 GA. X 12" LONG GALVANIZED SHEET METAL SADDLE (TYPICAL).
6. REFRIGERANT LIQUID PIPING (TYPICAL).
7. INSULATED REFRIGERANT SUCTION PIPING (TYPICAL).
8. SPRAY CUT ENDS WITH COATING OF GALVALUM (TYPICAL).
9. ELECTRICAL OR HVAC CONTROL CONDUIT. COORDINATE SIZE AND LOCATION WITH ELECTRICAL CONTRACTOR.

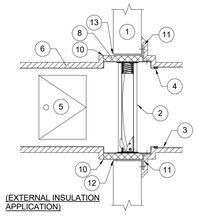
NOTES:

1. NUMBER OF PIPES AND SIZES VARIES.
2. SIZE GALVANIZED STEEL CHANNEL OR ANGLE IRON SUPPORTS AND THREADED ROD TO SUPPORT EXACT INSTALLED PIPE LOAD. REFERENCED SIZES ARE MINIMUM SIZE REQUIREMENTS.

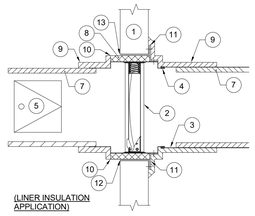
6 DETAIL - TRAPEZE PIPE SUPPORT
SCALE: NOT TO SCALE

KEYED NOTES:

1. FIRE RATED WALL OR FLOOR. REFER TO ARCHITECTURAL FOR TYPE AND CONSTRUCTION.
2. FIRE DAMPER WITH INTEGRAL WALL SLEEVE, MINIMUM 16-GAGE. CURTAIN SHALL BE OUT OF THE AIR STREAM.
3. GALVANIZED SHEET METAL DUCTWORK.
4. BREAK-AWAY "S" CLIP FITTING ALL AROUND ON ANCHORED SIDE OF THE DAMPER.
5. INSULATED DOUBLE WALL ACCESS DOOR.
6. EXTERNAL DUCT INSULATION. REFER TO INSULATION SPECIFICATIONS.
7. INTERNAL DUCT LINER INSULATION. REFER TO INSULATION SPECIFICATIONS.
8. INSTALL MAXIMUM 1" RIGID BOARD INSULATION AROUND DAMPER AT THE WALL PENETRATION. INSTALL AROUND THE DAMPER BEFORE SETTING IN PLACE IN THE FIRE BARRIER. TAPE AND SEAL ALL CONNECTIONS.
9. OVERLAP CONNECTION BETWEEN INTERNAL AND EXTERNAL LINER WITH MINIMUM 6-8" OVERLAP TO PREVENT THERMAL BRIDGING.
10. TAPE AND VAPOR SEAL EXTERNAL WRAP INSULATION TO RIGID INSULATION AT THE CONNECTION.
11. MINIMUM 1-1/2" X 3" X 16 GAGE GALVANIZED SHEET METAL ANGLE FRAMING AROUND PERIMETER OF SLEEVE. BOLT, TACK-WELD OR SCREW TO SLEEVE AT MAXIMUM SPACING OF 12" ON CENTERS AND WITH MINIMUM OF TWO CONNECTIONS ON EACH SIDE. FRAMING SHALL OVERLAP WALL OR FLOOR (TYPICAL) MINIMUM OF ONE INCH ON ALL FOUR SIDES.
12. WALL SLEEVE IF NEEDED FOR MASONRY CONSTRUCTION.
13. PROVIDE DUCT SEALANT TO BOND INSULATION TO FIRE BARRIER TO STOP AIR MOVEMENT.



(EXTERNAL INSULATION APPLICATION)

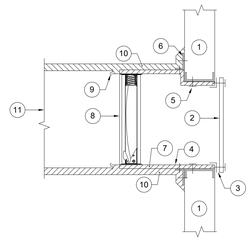


(LINER INSULATION APPLICATION)

GENERAL NOTE:

1. INSTALL FIRE DAMPERS IN ACCORDANCE WITH MANUFACTURER'S U.L. APPROVED INSTALLATION INSTRUCTIONS PER EACH APPLICATION.
2. INSTALLATION FOR FLOOR IS SIMILAR TO WALLS.
3. DETAIL IS FOR SINGLE ANGLE INSTALLATIONS ONLY.

7 DETAIL - CURTAIN FIRE DAMPER
SCALE: NOT TO SCALE



GENERAL NOTES:

1. DETAIL IS PROVIDED TO DESCRIBE GENERAL PROJECT REQUIREMENTS. CONTRACTOR MUST INSTALL FINAL FIRE DAMPERS PROVIDED ON PROJECT IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS TO MAINTAIN U.L. PRODUCT LISTING FOR EACH APPLICATION.

KEYED NOTES:

1. WALL. REFER TO ARCHITECTURAL DRAWINGS. STRUCTURALLY REINFORCE THE OPENING AS PER MANUFACTURER'S MINIMUM REQUIREMENTS.
2. AIR DEVICE. REFER TO HVAC EQUIPMENT SCHEDULES.
3. PROVIDE ANGLE FLASHING AT DAMPER OPENING ON WALL. SECURE AIR DEVICE FACE TO FLASHING WITH SHEET METAL SCREWS. (TYPICAL)
4. FIRE DAMPER WALL SLEEVE.
5. SECURE SLEEVE TO WALL WITH CONCRETE ANCHORS OR SCREWS. (TYPICAL)
6. PROVIDE ANCHOR BRACKET AS RECOMMENDED BY FIRE DAMPER MANUFACTURER.
7. THERMAL INSULATING FIRE BLANKET PROVIDED WITH DAMPER MANUFACTURER. TYPICALLY THICK.
8. CURTAIN TYPE DYNAMIC FIRE DAMPER. SECURE TO SLEEVE PER MANUFACTURE INSTRUCTIONS.
9. BREAKAWAY DUCT CONNECTION.
10. EXTERNAL DUCT INSULATION. REFER TO HVAC SPECIFICATIONS FOR DETAILS. IF DUCT IS DESIGNED WITH LINER INSULATION PROVIDE TRANSITION TO FIRE DAMPER AND PROVIDE EXTERNAL INSULATION OVER DAMPER AND FIRE BLANKET WITH THE SAME INSULATION VALUE AS THE SPECIFIED LINER INSULATION.
11. REFER TO DRAWINGS FOR DUCT SIZE AND ROUTING. PROVIDE TRANSITION AS NEEDED TO CONNECT TO FIRE DAMPER DUCT CONNECTION SIZE.

8 DETAIL - CURTAIN FIRE DAMPER (FDO)
SCALE: NOT TO SCALE

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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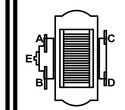
DATE ISSUED:
11/11/2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
HVAC DETAILS

SHEET NUMBER
M6.2

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EXISTING FIELD HOUSE
EXISTING AEP TRANSFORMER
EXISTING UNDERGROUND AEP PRIMARY TO REMAIN
EXISTING AEP SPLICE BOX TO REMAIN
EXISTING UNDERGROUND AEP PRIMARY TO REMAIN
EXISTING AEP TRANSFORMER
EXISTING UNDERGROUND AEP PRIMARY TO REMAIN
EXISTING UNDERGROUND AEP PRIMARY TO REMAIN
EXISTING UNDERGROUND FIBER OPTIC CONDUIT TO REMAIN
EXISTING FIBER BOX TO REMAIN
EXISTING 300KV/A1 PAD MOUNT UTILITY TRANSFORMER (TO REMAIN)
EXISTING AEP LIGHT POLE TO REMAIN
8 EXISTING SCOREBOARD TO BE REMOVED AND REPLACED BY NEW. REFER TO E1.0 FOR REQUIREMENTS.
EXISTING FIBER BOX TO REMAIN
EXISTING IN-GRADE FIBER BOX TO REMAIN
EXISTING UNDERGROUND FIBER OPTIC CONDUIT TO REMAIN
EXISTING UNDERGROUND FIBER OPTIC CONDUIT TO REMAIN
EXISTING EMPTY 2" PVC CONDUIT TO REMAIN
EXISTING UNDERGROUND FIBER OPTIC CONDUIT TO REMAIN
EXISTING FIBER BOX TO REMAIN
EXISTING UNDERGROUND FIBER OPTIC CONDUIT TO REMAIN
EXISTING PANEL "SB" TO REMAIN
EXISTING STORAGE BUILDING LIGHTING SHALL BE RENOVATED. REFER TO OTHER DRAWINGS FOR DEMOLITION AND NEW REQUIREMENTS.
EXISTING PANEL "M" TO REMAIN
2 ED1.0
EXISTING SIGNAGE 1
EXISTING FLAG POLES TO REMAIN 7
EXISTING POLE MOUNTED 30A., 240V., 2P, NF, NEMA-3R DISCONNECT SWITCH
EXISTING 25 SECOND PLAY CLOCK 3
EXISTING POLE MOUNTED 30A., 240V., 2P, NF, NEMA-3R DISCONNECT SWITCH
EXISTING 2" PVC CONDUIT WITH FIBER OPTIC CABLE TO REMAIN
EXISTING AEP LIGHT POLE TO REMAIN
EXISTING HOME SIDE - NORTH WEST TICKET BOOTH TO BE DEMOLISHED 2
2 EXISTING VISITOR SIDE - NORTH EAST TICKET BOOTH TO BE DEMOLISHED
EXISTING AEP LIGHT POLE TO REMAIN
EXISTING BOOSTER BUILDING TO BE RENOVATED. REFER TO OTHER DRAWINGS FOR DEMOLITION AND NEW REQUIREMENTS.
EXISTING HOME SIDE - NORTH WEST RESTROOM BUILDING TO BE RENOVATED. REFER TO OTHER DRAWINGS FOR DEMOLITION AND NEW REQUIREMENTS.
EXISTING VISITOR SIDE - NORTH EAST RESTROOM BUILDING TO BE RENOVATED. REFER TO OTHER DRAWINGS FOR DEMOLITION AND NEW REQUIREMENTS.
EXISTING STADIUM LIGHTING TOWER TO REMAIN
EXISTING 2" PVC CONDUIT WITH FIBER OPTIC CABLE TO REMAIN
EXISTING AEP LIGHT POLE TO REMAIN
EXISTING STADIUM LIGHTING TOWER TO REMAIN
EXISTING AEP LIGHT POLE TO REMAIN
EXISTING COLUMN MOUNTED FIBER BOX TO BE REMOVED. REFER TO E1.0 FOR ADDITIONAL REQUIREMENTS. COORDINATE REMOVAL OF FIBER OPTIC CABLE WITH CISD IT DEPARTMENT PRIOR TO REMOVAL OF BOX.
PANEL "D" TO REMAIN 10 WP GFI
PANEL "E" TO REMAIN
EXISTING CONCESSION BUILDING TO BE RENOVATED. REFER TO OTHER DRAWINGS FOR DEMOLITION AND NEW REQUIREMENTS.
EXISTING PRESS BOX ABOVE TO BE REMOVED AND REPLACED BY NEW. REFER TO ED1.2 FOR ADDITIONAL REQUIREMENTS.
EXISTING 36" X 36" X 12" RACK MOUNTED SPLICE BOX TO REMAIN RE: 3/ED1.0 4
EXISTING HOME SIDE - TICKET BOOTH TO BE DEMOLISHED 2
10 WP GFI
EXISTING AEP LIGHT POLE TO REMAIN
EXISTING STADIUM LIGHTING TOWER TO REMAIN
EXISTING HOME SIDE - SOUTH WEST RESTROOM BUILDING TO BE RENOVATED. REFER TO OTHER DRAWINGS FOR DEMOLITION AND NEW REQUIREMENTS.
EXISTING VISITOR SIDE - SOUTH EAST RESTROOM BUILDING TO BE RENOVATED. REFER TO OTHER DRAWINGS FOR DEMOLITION AND NEW REQUIREMENTS.
EXISTING CONCESSION BUILDING TO BE RENOVATED. REFER TO OTHER DRAWINGS FOR DEMOLITION AND NEW REQUIREMENTS.
WP GFI 10
PANEL "B2" TO REMAIN
PANEL "B" TO REMAIN
EXISTING STADIUM LIGHTING TOWER TO REMAIN
EXISTING AEP LIGHT POLE TO REMAIN
EXISTING VISITOR SIDE - SOUTH WEST TICKET BOOTH TO BE DEMOLISHED 2
2 EXISTING VISITOR SIDE - SOUTH EAST TICKET BOOTH TO BE DEMOLISHED
EXISTING AEP LIGHT POLE TO REMAIN
3 EXISTING 25 SECOND PLAY CLOCK
EXISTING POLE MOUNTED 30A., 240V., 2P, F, NEMA-3R DISCONNECT SWITCH
1 EXISTING MARQUEE SIGN.
EXISTING SIGNAGE 1

1 ELECTRICAL DEMOLITION SITE PLAN
1" = 30'-0"

GENERAL NOTES:

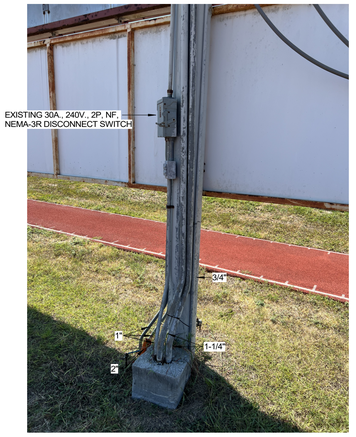
A. INFORMATION INCLUDED ON THIS DRAWING IS INTENDED TO INDICATE THE GENERAL CHARACTER AND EXTENT OF WORK REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
B. ELECTRICAL PROJECT DESIGN IS BASED UPON 2020 NEC AND 2015 IECC.
C. MOST EXISTING UNDERGROUND UTILITIES ARE NOT INDICATED ON THIS DRAWING. THOSE EXISTING UTILITIES WHICH ARE INDICATED ARE SCHEMATIC AND BASED UPON EXISTING DRAWINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR JOBSITE LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES PRIOR TO DIGGING, TRENCHING, OR PIER DRILLING.
D. MINIMUM CONDUIT SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS 3/4" CONDUIT UNLESS OTHERWISE INDICATED.
E. MINIMUM CONDUCTOR SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS #10AWG UNLESS OTHERWISE INDICATED.

KEYED NOTES:

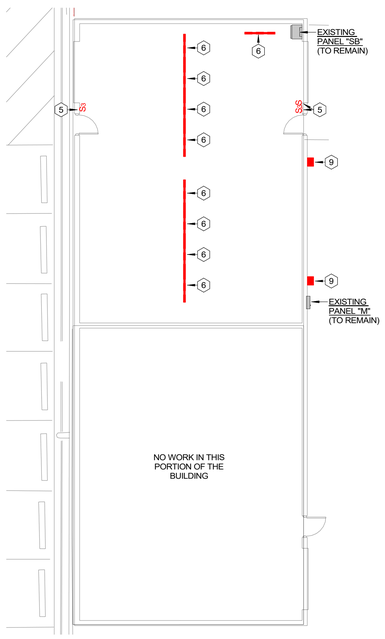
1. EXISTING SIGN / SURFACE MOUNTED LIGHTING FIXTURES TO BE REMOVED. REMOVE EXPOSED CONDUIT AND BOX(ES). REMOVE CONDUCTORS TO SOURCE. EXISTING LATERAL CONDUIT BELOW GRADE MAY BE ABANDONED IN PLACE. JOBSITE LOCATE SOURCE.
2. EXISTING BUILDING TO BE REMOVED. REMOVE ALL ASSOCIATED ELECTRICAL FIXTURES, DEVICES, AND VERTICAL CONDUIT. REMOVE CONDUCTORS TO SOURCE. EXISTING LATERAL CONDUIT BELOW GRADE MAY BE ABANDONED IN PLACE. JOBSITE LOCATE SOURCE.
3. EXISTING PLAY CLOCK SHALL BE REMOVED AND REPLACED BY NEW. REFER TO E1.0 FOR ADDITIONAL REQUIREMENTS.
4. EXISTING SURFACE MOUNTED CONDUIT AND CONDUCTORS ROUTED UP EXISTING COLUMN ABOVE SPLICE BOX SHALL BE REMOVED.
5. EXISTING LIGHTING CONTROL DEVICE SHALL BE REMOVED AND REPLACED BY NEW AT SAME APPROXIMATE LOCATION. EXISTING OUTLET BOX SHALL REMAIN. REMOVE CONDUCTORS TO NEAREST JUNCTION / SOURCE. EXISTING CONDUIT IN WALL MAY BE RE-USED AS IS FEASIBLE. REFER TO E1.0 FOR ADDITIONAL REQUIREMENTS.
6. EXISTING LIGHTING FIXTURE SHALL BE REMOVED AND REPLACED BY NEW IN SAME APPROXIMATE LOCATION. REFER TO E1.0 FOR ADDITIONAL REQUIREMENTS.
7. APPROXIMATE LOCATION OF SIX (6) - EXISTING CONDUIT (ONE (1) - 3/4"C., TWO (2) - 1-1/4"C, THREE (3) - 1"C) SERVING EXISTING SCOREBOARD. REFER TO 4/ED1.0. REMOVE ALL EXCEPT 2" EMPTY CONDUIT AS PER KEYED NOTE 8.
8. EXISTING SCOREBOARD TO BE REMOVED AND REPLACED BY NEW. REMOVE ALL ASSOCIATED ELECTRICAL GEAR, DEVICES, AND VERTICAL CONDUIT ABOVE GRADE. REMOVE ALL CONDUCTORS / CABLE TO SOURCE. EXISTING UNDERGROUND LATERAL CONDUIT MAY BE ABANDONED IN PLACE. REFER TO E1.0 FOR NEW REQUIREMENTS.
9. EXISTING LIGHTING FIXTURE SHALL BE REMOVED. REMOVE CONDUIT AND CONDUCTORS TO SOURCE.
10. EXISTING WIRING DEVICE MOUNTED TO UNDERSIDE OF BLEACHERS SHALL BE REMOVED. REMOVE CONDUIT AND CONDUCTORS TO SOURCE.



3 EXISTING RACK MOUNTED SPLICE BOX
N.T.S.



4 EXISTING SCOREBOARD CONDUIT STUBS
N.T.S.



2 ELECTRICAL LIGHTING DEMOLITION PLAN - STORAGE BUILDING
1/8" = 1'-0"

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

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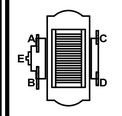
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
ELECTRICAL DEMOLITION SITE PLAN

SHEET NUMBER
ED1.0

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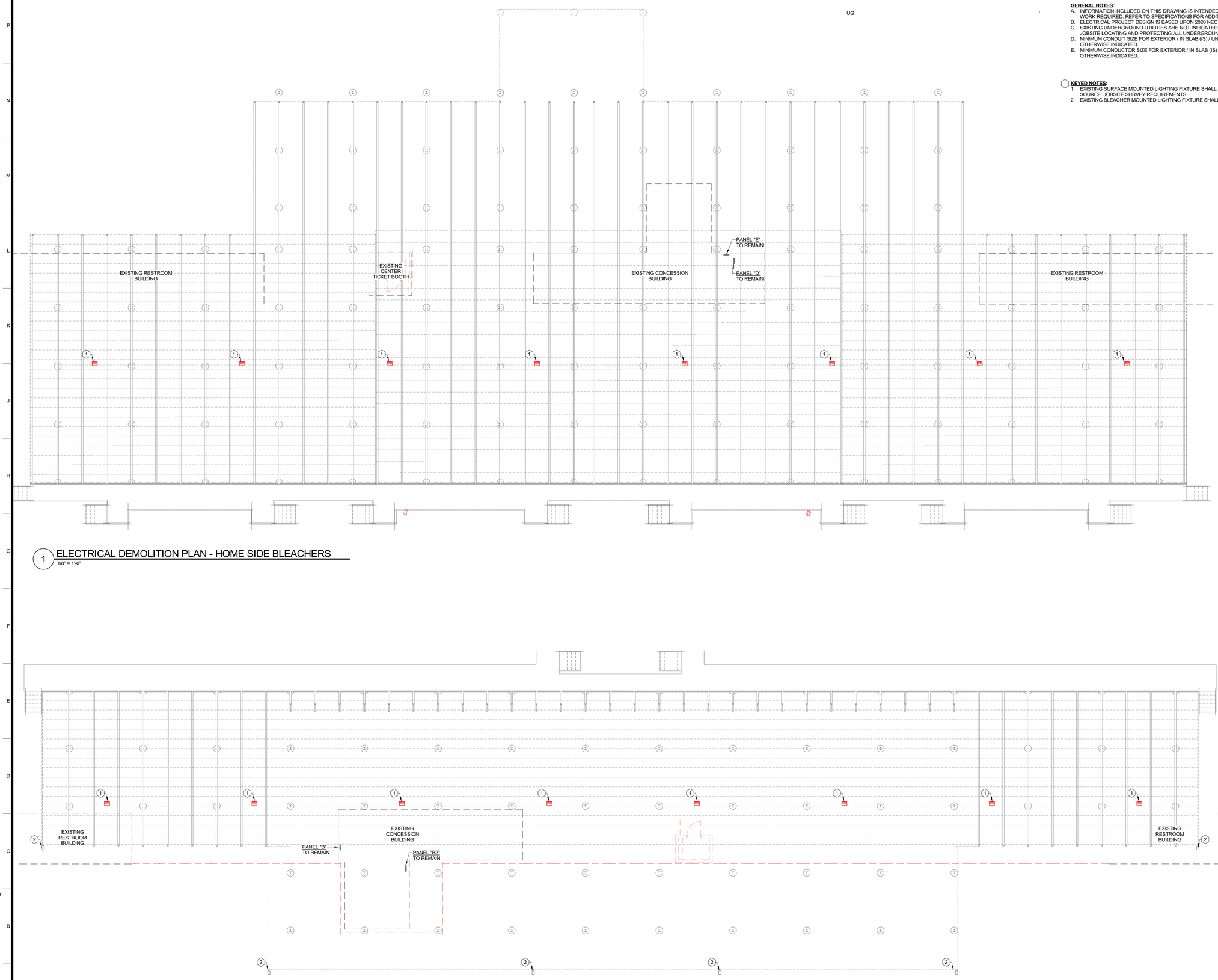

1 ELECTRICAL DEMOLITION PLAN - HOME SIDE BLEACHERS
1/8" = 1'-0"

2 ELECTRICAL DEMOLITION PLAN - VISITOR SIDE BLEACHERS
1/8" = 1'-0"

GENERAL NOTES:

A. INFORMATION INCLUDED ON THIS DRAWING IS INTENDED TO INDICATE THE GENERAL CHARACTER AND EXTENT OF WORK REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
B. ELECTRICAL PROJECT DESIGN IS BASED UPON 2020 NEC AND 2015 IECC.
C. EXISTING UNDERGROUND UTILITIES ARE NOT INDICATED ON THIS DRAWING. CONTRACTOR SHALL BE RESPONSIBLE FOR JOBSITE LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES PRIOR TO DIGGING, TRENCHING, OR PIER DRILLING.
D. MINIMUM CONDUIT SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS 3/4" CONDUIT UNLESS OTHERWISE INDICATED.
E. MINIMUM CONDUCTOR SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS #10 AWG UNLESS OTHERWISE INDICATED.

KEYED NOTES:

1. EXISTING SURFACE MOUNTED LIGHTING FIXTURE SHALL BE REMOVED. REMOVE CONDUIT AND CONDUCTORS TO SOURCE. JOBSITE SURVEY REQUIREMENTS.
2. EXISTING BLEACHER MOUNTED LIGHTING FIXTURE SHALL REMAIN. REFER TO 2/E1.1 FOR ADDITIONAL REQUIREMENTS.

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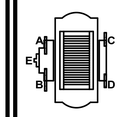
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
ELECTRICAL DEMOLITION PLAN - BLEACHERS

SHEET NUMBER
ED1.1

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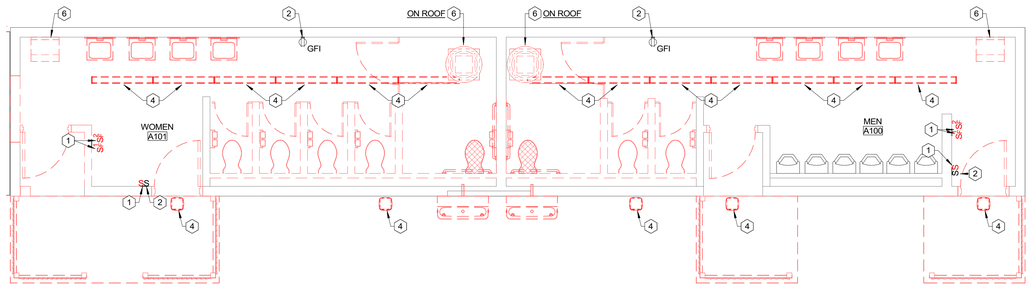
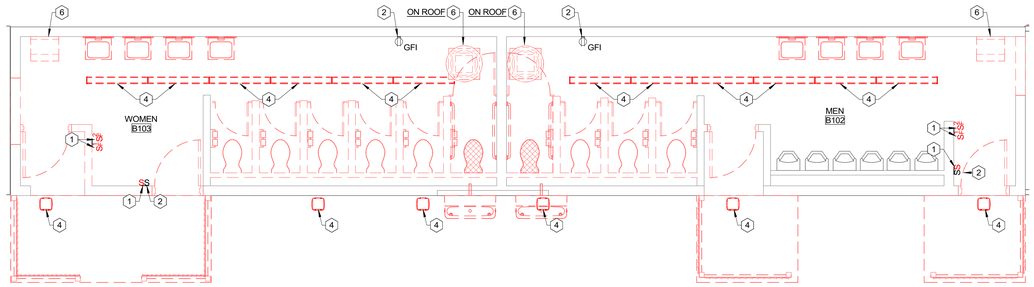
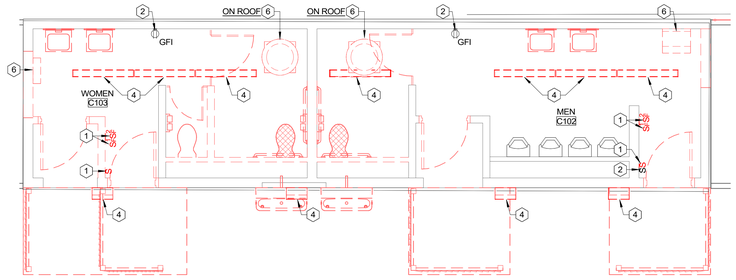


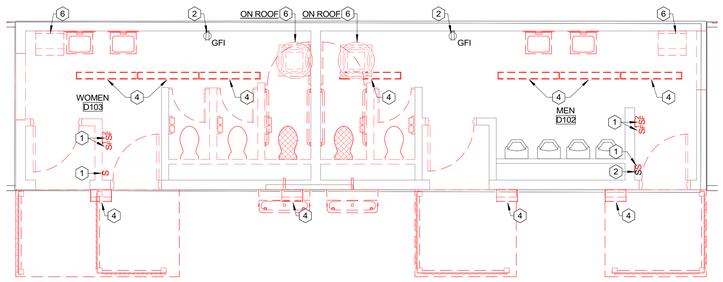
1 ELECTRICAL DEMOLITION PLAN - HOME SIDE - RESTROOM NORTH WEST
1/4" = 1'-0"



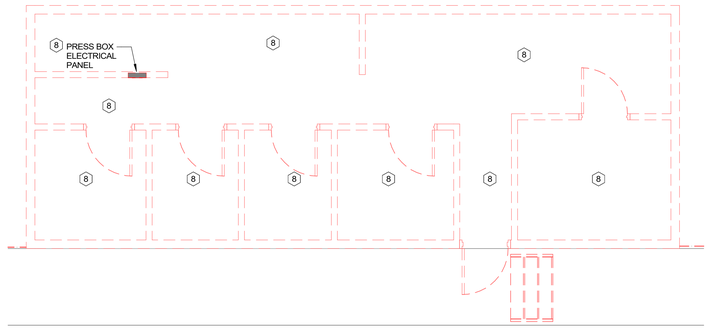
2 ELECTRICAL DEMOLITION PLAN - HOME SIDE - RESTROOM SOUTH WEST
1/4" = 1'-0"



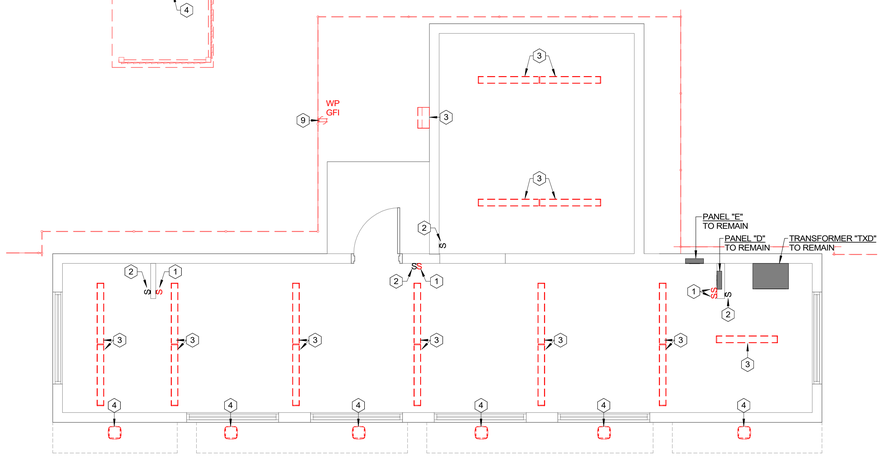
3 ELECTRICAL DEMOLITION PLAN - VISITOR SIDE - RESTROOM NORTH EAST
1/4" = 1'-0"



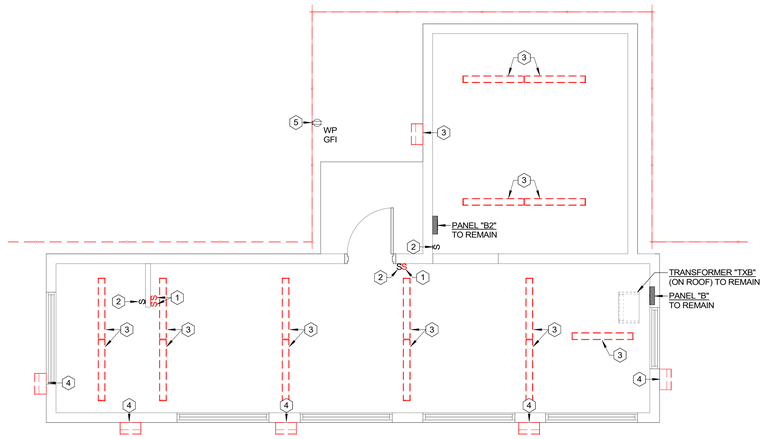
4 ELECTRICAL DEMOLITION PLAN - VISITOR SIDE - RESTROOM SOUTH EAST
1/4" = 1'-0"



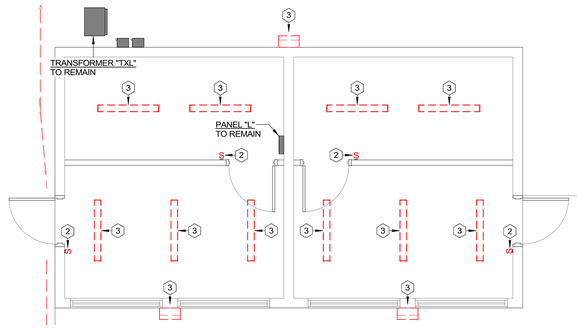
5 ELECTRICAL DEMOLITION PLAN - PRESS BOX
1/4" = 1'-0"



6 ELECTRICAL LIGHTING DEMOLITION PLAN - HOMESIDE CONCESSION
1/4" = 1'-0"



7 ELECTRICAL LIGHTING DEMOLITION PLAN - VISITOR SIDE - CONCESSION
1/4" = 1'-0"



8 ELECTRICAL LIGHTING DEMOLITION PLAN - HOMESIDE BOOSTER
1/4" = 1'-0"

GENERAL NOTES:

A. INFORMATION INCLUDED ON THIS DRAWING IS INTENDED TO INDICATE THE GENERAL CHARACTER AND EXTENT OF WORK REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
B. ELECTRICAL PROJECT DESIGN IS BASED UPON 2020 NEC AND 2015 IECC.
C. ELECTRICAL RENOVATIONS FOR CONCESSION BUILDINGS AND BOOSTER BUILDING ARE LIMITED TO LIGHTING EXCEPT AS OTHERWISE SPECIFICALLY INDICATED. THE BALANCE OF ELECTRICAL SYSTEMS SHALL REMAIN AS IS EXCEPT AS OTHERWISE SPECIFICALLY INDICATED.
D. MINIMUM CONDUIT SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS 3/4" CONDUIT UNLESS OTHERWISE INDICATED.
E. MINIMUM CONDUCTOR SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS #10AWG UNLESS OTHERWISE INDICATED.

DEMOLITION KEYED NOTES:

1. EXISTING DEVICE SHALL BE REMOVED. REMOVE CONDUIT AND CONDUCTORS TO NEAREST JUNCTION / SOURCE. ABANDON CONDUIT IN WALL CAVITY. PROVIDE BLANK STAINLESS STEEL COVER PLATE ON / OVER EXISTING FLUSH BOX IF / AS REQUIRED.
2. EXISTING DEVICE SHALL BE REMOVED AND REPLACED BY NEW AT SAME APPROXIMATE LOCATION. REFER TO E1.2 / E1.3 FOR ADDITIONAL REQUIREMENTS.
3. EXISTING LIGHTING FIXTURE SHALL BE REMOVED AND REPLACED BY NEW IN SAME APPROXIMATE LOCATION. EXISTING CONCEALED CONDUIT AND OUTLET BOXES MAY BE RETAINED AND RE-USED AS IS FEASIBLE. PROVIDE NEW CONDUIT IF / AS REQUIRED. REMOVE ALL CONDUCTORS TO NEAREST JUNCTION. REFER TO E1.4 FOR ADDITIONAL REQUIREMENTS.
4. EXISTING LIGHTING FIXTURE SHALL BE REMOVED. REMOVE CONDUCTORS TO SOURCE / NEAREST JUNCTION. PROVIDE BLANK STAINLESS STEEL COVER PLATE ON / OVER EXISTING FLUSH BOX.
5. EXISTING OUTLET BOX SHALL REMOVED AND REINSTALLED ON NEW FENCE. EXISTING WIRING DEVICE AND COVERPLATE SHALL BE REPLACED BY NEW AT SAME APPROXIMATE LOCATION. REFER TO E1.4 FOR ADDITIONAL REQUIREMENTS.
6. EXISTING HVAC UNIT SHALL BE REMOVED. REMOVE ALL ELECTRICAL EQUIPMENT, CONDUIT AND CONDUCTORS TO SOURCE. JOBSITE SURVEY REQUIREMENTS.
7. NOT USED.
8. EXISTING PRESS BOX TO BE DEMOLISHED. REMOVE ALL ELECTRICAL GEAR LIGHTING FIXTURES, DEVICES, ETC. REMOVE CONDUIT AND CONDUCTORS TO SOURCE.
9. EXISTING DEVICE SHALL BE REMOVED. REMOVE CONDUCTORS TO NEAREST JUNCTION.

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11/11/2025

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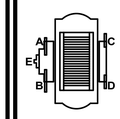

PLAN NORTH
TRUE NORTH

SHEET NAME
ELECTRICAL DEMOLITION FLOOR PLANS

SHEET NUMBER
ED1.2

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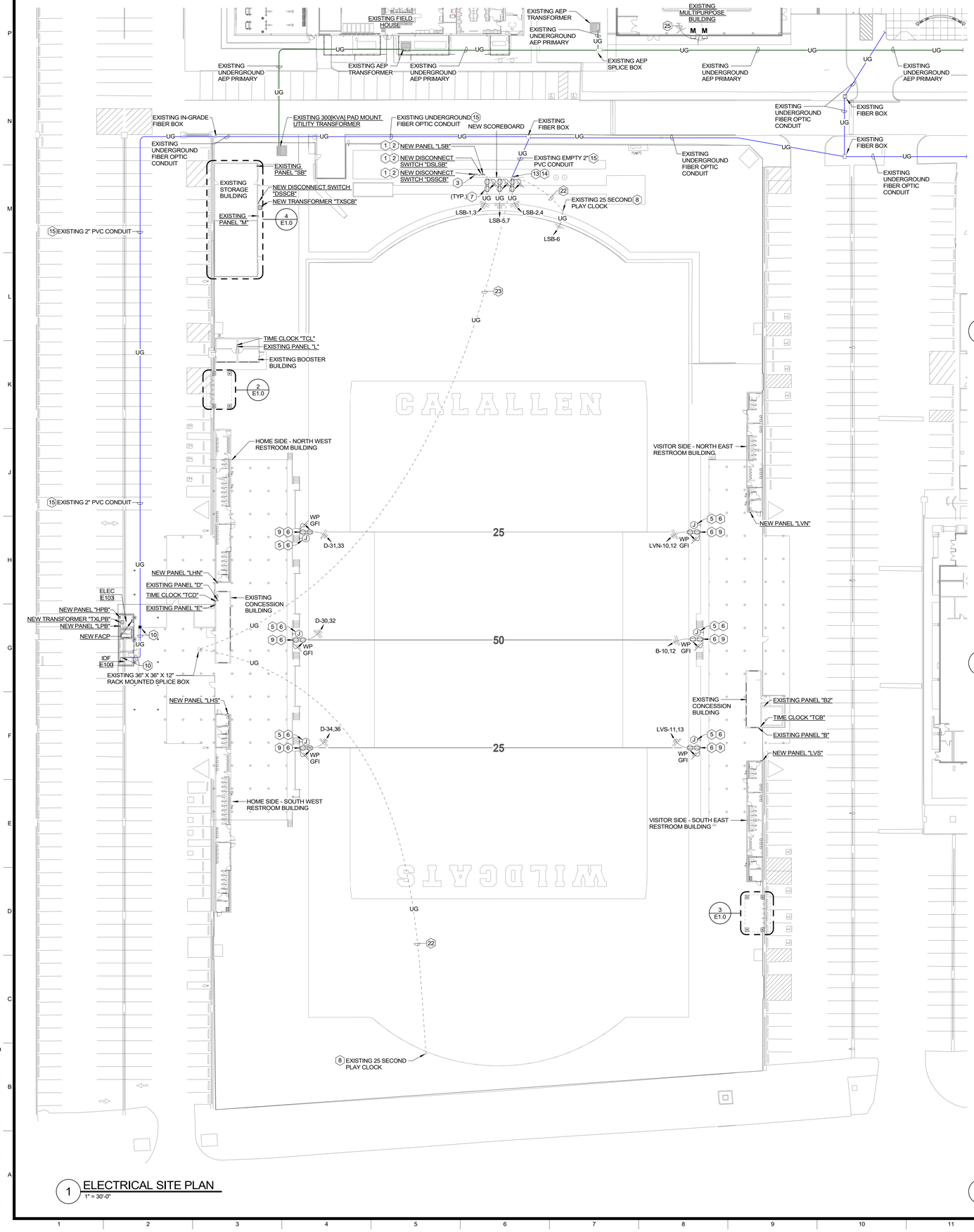
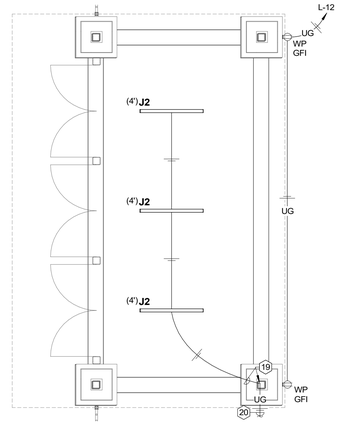
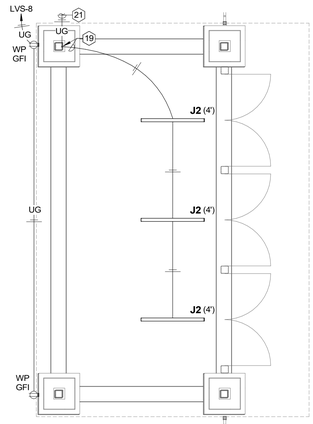


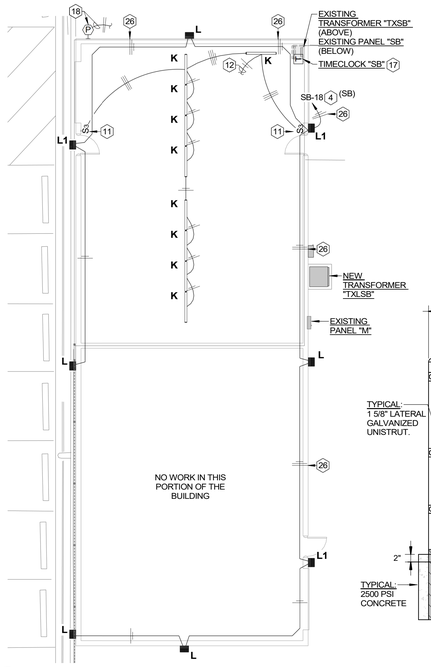
1 ELECTRICAL SITE PLAN
1" = 30'-0"



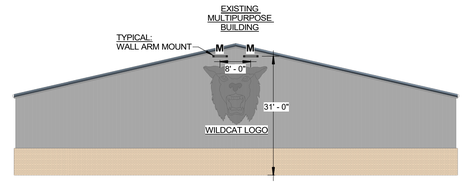
2 ELECTRICAL PLAN - HOME SIDE MAIN ENTRANCE
1/4" = 1'-0"



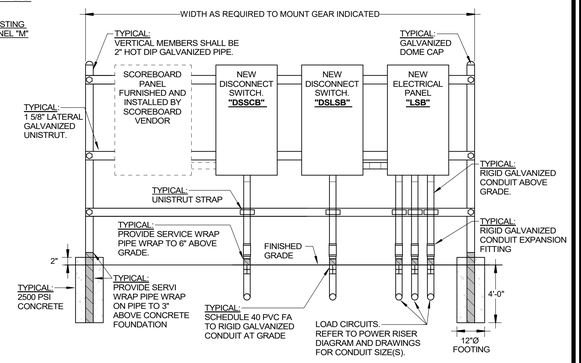
3 ELECTRICAL PLAN - VISITOR SIDE MAIN ENTRANCE
1/4" = 1'-0"



4 ELECTRICAL LIGHTING FLOOR PLAN - STORAGE BUILDING
1/8" = 1'-0"



5 "M" FIXTURE MOUNTING DETAIL
1/16" = 1'-0"



6 UNISTRUT RACK DETAIL
N.T.S.

GENERAL NOTES:

A. INFORMATION INCLUDED ON THIS DRAWING IS INTENDED TO INDICATE THE GENERAL CHARACTER AND EXTENT OF WORK REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
B. ELECTRICAL PROJECT DESIGN IS BASED UPON 2020 NEC AND 2015 IECC.
C. MOST EXISTING UNDERGROUND UTILITIES ARE NOT INDICATED ON THIS DRAWING. THOSE EXISTING UTILITIES WHICH ARE INDICATED ARE SCHEMATIC AND BASED UPON EXISTING DRAWINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR JOBSITE LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES PRIOR TO DIGGING, TRENCHING, OR PIER DRILLING.
D. MINIMUM CONDUIT SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS 3/4" CONDUIT UNLESS OTHERWISE INDICATED.
E. MINIMUM CONDUCTOR SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS #10AWG UNLESS OTHERWISE INDICATED.
F. COORDINATE ALL UNDERGROUND CONDUIT CROSSING NEW SANITARY SEWER, DOMESTIC WATER, AND / OR GAS, LINE(S), WITH RESPECTIVE CONTRACTOR. REFER TO PLUMBING AND CIVIL DRAWINGS.

KEYED NOTES:

1. REFER TO POWER RISER DIAGRAM FOR ADDITIONAL INFORMATION.
2. MOUNT GEAR TO UNISTRUT RACK.
3. UNISTRUT RACK. REFER TO UNISTRUT RACK DETAIL FOR RACK REQUIREMENTS.
4. ROUTE CONDUIT AND CONDUCTORS THROUGH TIME CLOCK (INDICATED).
5. PROVIDE TWO (2) - 4"W X 4"H X 4"D PVC WEATHERPROOF BOXES WITH ONE (1) - 1 1/2" CONDUIT WITH PULLCORD (FOR EACH OUTLET BOX). JOBSITE LOCATE ROUTE UP TO PRESS BOX.
6. INSTALL DEVICE BELOW BLEACHER AT RESPECTIVE YARDAGE (50 OR 25) LINE. COORDINATE LOCATION WITH ARCHITECT / OWNER.
7. MOUNT DEVICE TO SCOREBOARD POSTS.
8. EXISTING 25-SECOND PLAY CLOCK AND DISCONNECT SWITCH SHALL BE REMOVED AND REPLACED WITH NEW IN SAME APPROXIMATE LOCATION. DISCONNECT AND RECONNECT POWER AS REQUIRED. COORDINATE RECONNECTION REQUIREMENTS WITH PLAY CLOCK VENDOR.
9. PROVIDE WEATHERPROOF BOX AND WEATHERPROOF WHILE-IN-USE COVER.
10. INTERCEPT AND EXTEND EXISTING 2" PVC CONDUIT. STUB CONDUIT AT 2' ABOVE FINISHED FLOOR IN IDF E100. COORDINATE STUB LOCATION WITH ARCHITECT / OWNER'S IT DEPARTMENT.
11. INSTALL NEW LIGHTING CONTROL DEVICE IN EXISTING OUTLET BOX REMAINING FROM DEMOLITION. EXTEND NEW CONDUIT AND CONDUCTORS AS INDICATED. PROVIDE REQUIRED STAINLESS STEEL COVERPLATE FOR EXISTING FLUSH BOX REMAINING FROM DEMOLITION. JOBSITE SURVEY REQUIREMENTS.
12. EXTEND NEW CONDUIT AND CONDUCTORS TO EXISTING LIGHTING BRANCH CIRCUIT AS REQUIRED.
13. EXTEND EXISTING CONDUIT TO NEW SCOREBOARD POST AS REQUIRED. INSTALL NEW 24"W X 24"H X 12"D HOFFMAN FIBERGLASS WEATHERPROOF BOX WITH HINGED LOCKABLE TURN HANDLE DOOR.
14. EXTEND EXISTING CONDUIT FROM 25-SECOND PLAY CLOCK TO NEW SCOREBOARD POST AS REQUIRED. ROUTE CONTROL CONDUIT TO NEW BOX AT KEYED NOTE 13. ROUTE POWER CONDUIT TO NEW PANEL "LSB".
15. INSTALL TWO (2) - NEW PULLCORDS WITHIN EXISTING CONDUIT. JOBSITE SURVEY REQUIREMENTS.
16. NOT USED.
17. TIME CLOCK "SB" SHALL BE INTERMATIC CAT. NO. T171.
18. PHOTOELECTRIC CELL SHALL BE INTERMATIC CAT. NO. EK4436SM. PROVIDE NEOPRENE GASKET. SERIES CONNECT WITH TIME CLOCK AS REQUIRED FOR PHOTOCELL ON / TIME CLOCK "OFF" FUNCTION.
19. ROUTE CONDUIT AND CONDUCTORS DOWN CONCEALED IN STRUCTURAL STEEL COLUMN CAVITY.
20. REFER TO 1/E1.1 FOR CONTINUATION.
21. REFER TO 2/E1.1 FOR CONTINUATION.
22. EXISTING ONE (1) - 3/4" CONDUIT FOR 25-SECOND PLAY CLOCK CONTROL. INSTALL NEW PULLCORD.
23. EXISTING TWO (2) - 1-1/4" CONDUIT (SPARE) AND ONE (1) - 3/4" CONDUIT (25-SECOND PLAY CLOCK CONTROL). INSTALL NEW PULLCORD IN EACH.
24. EXTEND EXISTING CONDUITS (INDICATED BY KEYED NOTES 22 & 23) TERMINATED AT EXISTING RACK MOUNTED SPLICE BOX UP TO PRESS BOX AND STUB UP IN VIDEO E208 ADJACENT TO VIDEO RACK. REFER TO E1.5 FOR VIDEO RACK LOCATION.
25. TERMINATE CONDUIT AND CONDUCTORS FROM NEW LIGHTING FIXTURE TO EXISTING EXTERIOR LIGHTING BRANCH CIRCUIT. SEAL PENETRATION WEATHERTIGHT AND RODENT PROOF. JOBSITE SURVEY REQUIREMENTS.
26. DERIVE UNSWITCHED CONDUCTOR FOR EMERGENCY BATTERY PACK IN LIGHTING FIXTURES TYPE "L1" FROM LINE SIDE OF TIME CLOCK.

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11/11/2025

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Corpus Christi, TX 78405-3678
Registration # F-006328

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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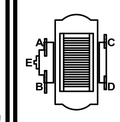
DATE ISSUED:
11/11/2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH — TRUE NORTH

SHEET NAME
ELECTRICAL SITE PLAN

SHEET NUMBER
E1.0

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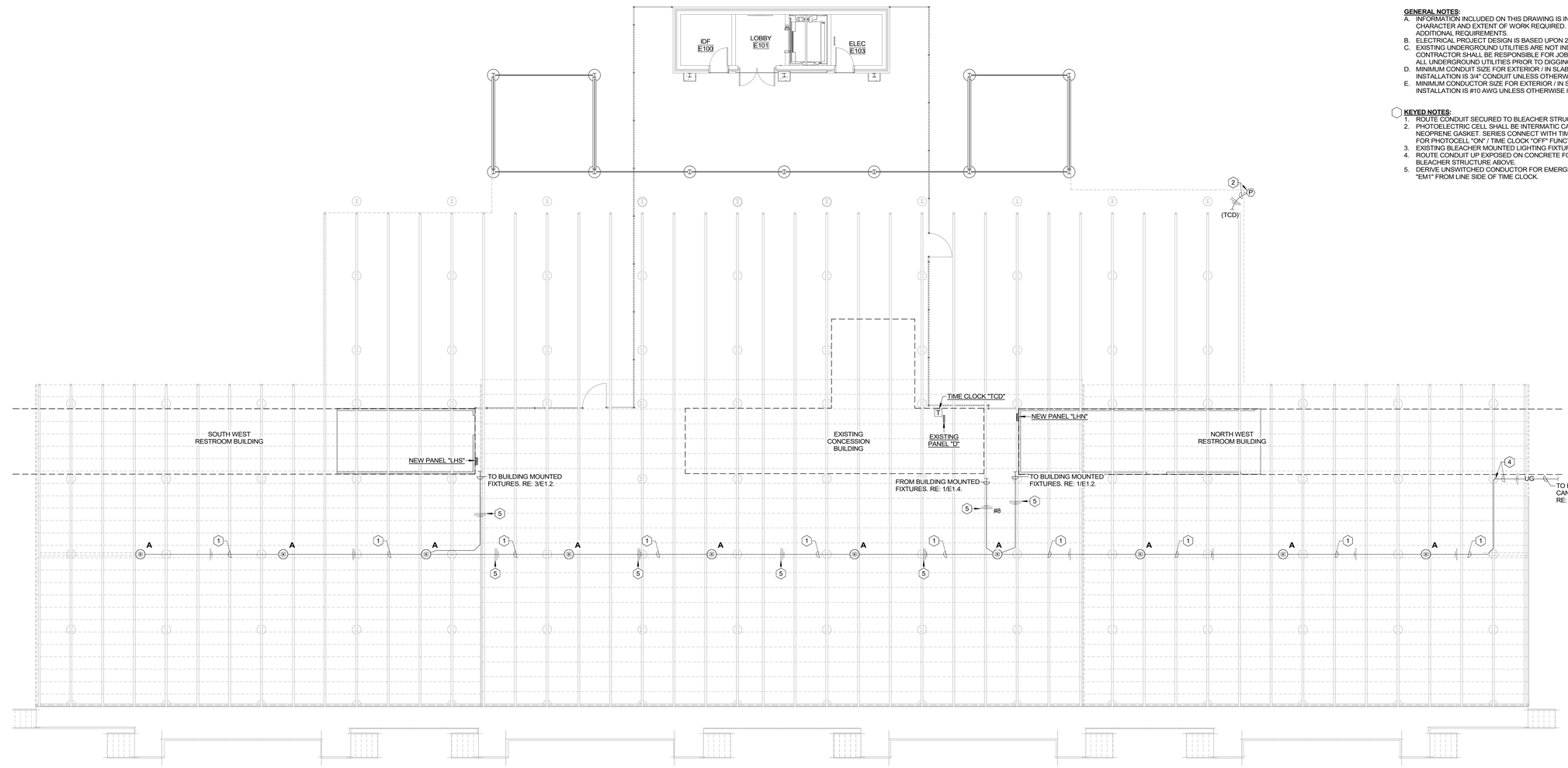
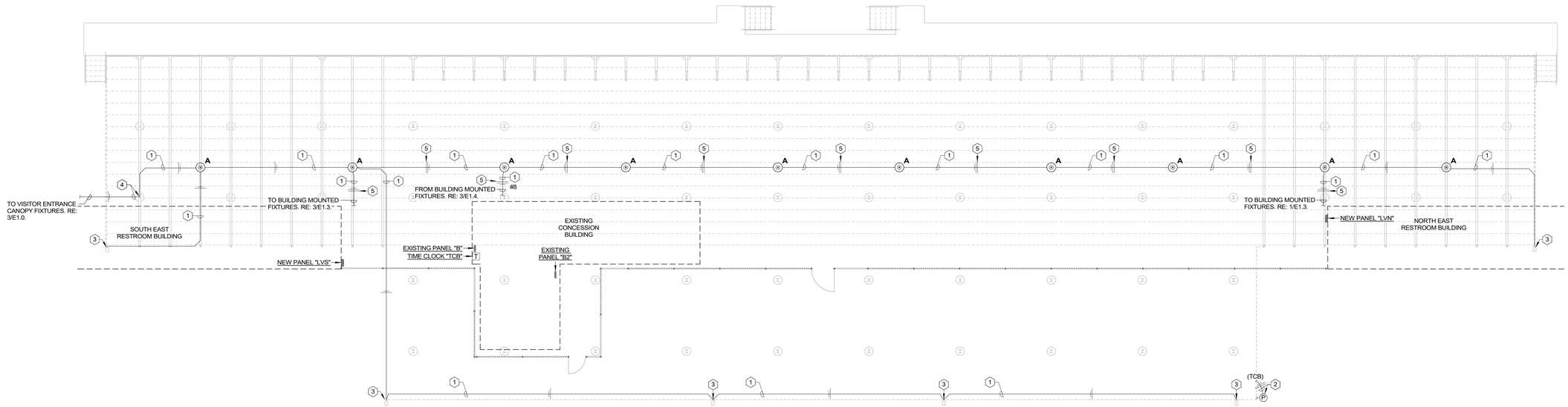


TRUE PLAN 1 ELECTRICAL FLOOR PLAN - HOME SIDE BLEACHERS

1/8" = 1'-0"



TRUE PLAN 2 ELECTRICAL FLOOR PLAN - VISITOR SIDE BLEACHERS

1/8" = 1'-0"

GENERAL NOTES:

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C. EXISTING UNDERGROUND UTILITIES ARE NOT INDICATED ON THIS DRAWING. CONTRACTOR SHALL BE RESPONSIBLE FOR JOBSITE LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES PRIOR TO DIGGING, TRENCHING, OR PIER DRILLING.
D. MINIMUM CONDUIT SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS 3/4" CONDUIT UNLESS OTHERWISE INDICATED.
E. MINIMUM CONDUCTOR SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS #10 AWG UNLESS OTHERWISE INDICATED.

KEYED NOTES:

1. ROUTE CONDUIT SECURED TO BLEACHER STRUCTURE ABOVE.
2. PHOTOELECTRIC CELL SHALL BE INTERMATIC CAT. NO. EK4336SM. PROVIDE NEOPRENE GASKET. SERIES CONNECT WITH TIME CLOCK (INDICATED) AS REQUIRED FOR PHOTOCELL "ON" / TIME CLOCK "OFF" FUNCTION.
3. EXISTING BLEACHER MOUNTED LIGHTING FIXTURE.
4. ROUTE CONDUIT UP EXPOSED ON CONCRETE FOOTING / STRUCTURAL COLUMN TO BLEACHER STRUCTURE ABOVE.
5. DERIVE UNSWITCHED CONDUCTOR FOR EMERGENCY LIGHTING FIXTURE TYPES "EM1" FROM LINE SIDE OF TIME CLOCK.

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

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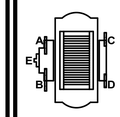

PLAN NORTH TRUE NORTH

SHEET NAME
ELECTRICAL FLOOR PLAN - BLEACHERS

SHEET NUMBER
E1.1

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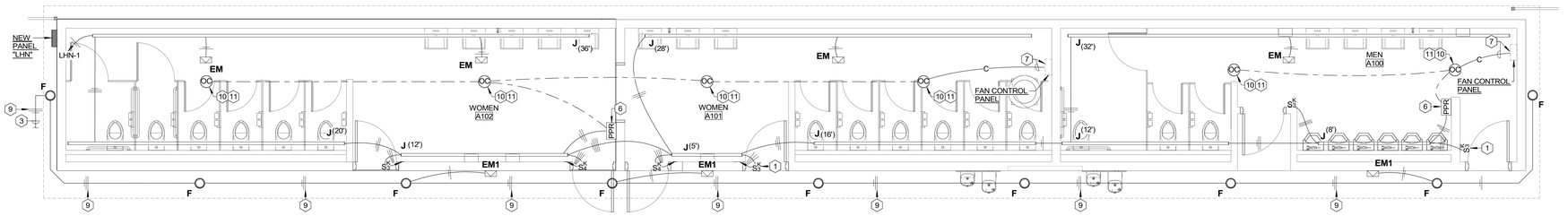
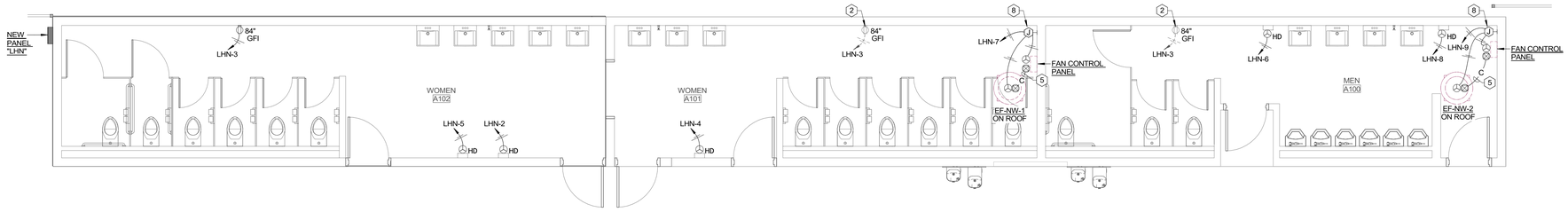


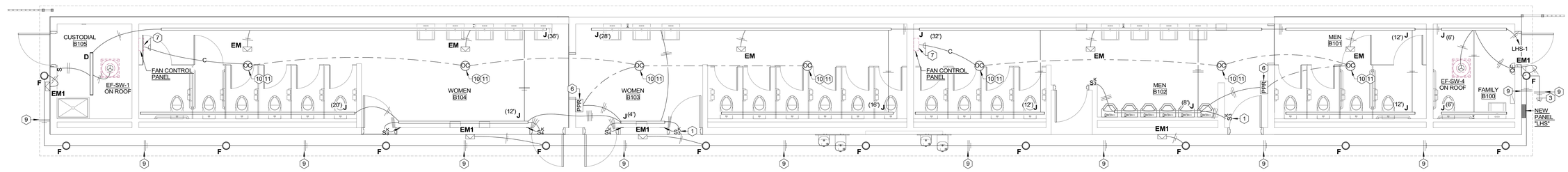
TRUE NORTH PLAN — 1 — ELECTRICAL LIGHTING FLOOR PLAN - HOME SIDE - RESTROOM NORTH WEST

1/4" = 1'-0"



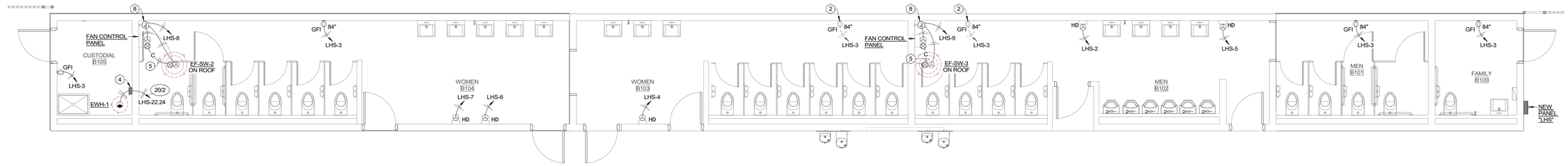
TRUE NORTH PLAN — 2 — ELECTRICAL POWER FLOOR PLAN - HOME SIDE - RESTROOM NORTH WEST

1/4" = 1'-0"



TRUE NORTH PLAN — 3 — ELECTRICAL LIGHTING FLOOR PLAN - HOME SIDE - RESTROOM SOUTH WEST

1/4" = 1'-0"



TRUE NORTH PLAN — 4 — ELECTRICAL POWER FLOOR PLAN - HOME SIDE - RESTROOM SOUTH WEST

1/4" = 1'-0"

GENERAL NOTES:

A. INFORMATION INCLUDED ON THIS DRAWING IS INTENDED TO INDICATE THE GENERAL CHARACTER AND EXTENT OF WORK REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
B. ELECTRICAL PROJECT DESIGN IS BASED UPON 2020 NEC AND 2015 IECC.
C. MINIMUM CONDUIT SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS 3/4" CONDUIT UNLESS OTHERWISE INDICATED.
D. MINIMUM CONDUCTOR SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS #10AWG UNLESS OTHERWISE INDICATED.
E. DEVICES INSTALLED AT EXISTING WALLS TO REMAIN SHALL UTILIZE SURFACE MOUNTED EMT CONDUIT, 1900 BOXES, AND INDUSTRIAL RAISED COVER PLATES. PAINT ALL VISIBLE ELECTRICAL COMPONENTS TO MATCH WALL SURFACE. REFER TO ARCHITECTURAL DRAWINGS FOR EXISTING / NEW WALL TYPES.
F. REFER TO SPECIFICATIONS FOR BOX AND CONDUIT REQUIREMENTS AT NEW WALLS.
G. REFER TO HVAC DRAWING DETAILS FOR REQUIREMENTS AT EXHAUST FANS.

KEYED NOTES:

1. INSTALL NEW LIGHTING CONTROL DEVICE AT EXISTING OUTLET BOX REMAINING FROM DEMOLITION. EXTEND NEW CONDUIT AND CABLE / CONDUCTORS AS INDICATED.
2. INSTALL NEW DEVICE AND COVER PLATE AT EXISTING OUTLET BOX REMAINING FROM DEMOLITION. TERMINATE AT EXISTING CONDUCTORS AS REQUIRED.
3. REFER TO E1.1 FOR CONTINUATION.
4. 30A, 240V., 2P, NF, NEMA-3R DISCONNECT SWITCH.
5. ROUTE ONE (1) 3/4" CONDUIT WITH PULLCORD FOR CONTROL CONDUCTORS BY HVAC CONTRACTOR.
6. SURFACE MOUNT JUNCTION BOX FOR DEVICE ON WALL BELOW GYPBOARD CEILING AT A MINIMUM OF 7' ABOVE FINISHED FLOOR ON WALL AS REQUIRED.
7. PROVIDE ONE (1) - 1/2" CONDUIT WITH TWO (2) - #16 CONDUCTORS FROM OCCUPANCY SENSOR "OC" RELAY FOR CONTROL OF EXHAUST FAN (HIGH SPEED TRIGGER) WITHIN SPACE. ROUTE CONDUIT AND CONDUCTORS TO FAN CONTROL PANEL INDICATED AND TERMINATE TO FAN HIGH SPEED INPUT TERMINALS AS REQUIRED BY CONTROL PANEL WIRING DIAGRAMS.
8. SURFACE MOUNT JUNCTION BOX ON WALL AT ELEVATION / LOCATION SELECTED BY HVAC CONTRACTOR.
9. DERIVE UNSWITCHED CONDUCTOR FOR EMERGENCY LIGHTING FIXTURE TYPE "EM1" FROM LINE SIDE OF TIME CLOCK.
10. PARALLEL CONNECT OCCUPANCY SENSORS SUCH THAT ANY MOTION DETECTED ENABLES ALL LIGHT FIXTURES WITHIN SPACE.
11. PARALLEL CONNECT RELAY CONDUCTORS SUCH THAT ANY MOTION DETECTED ENABLES FAN HIGH SPEED.

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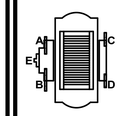
KEY PLAN (NTS)



PLAN NORTH — TRUE NORTH

SHEET NAME
ELECTRICAL FLOOR PLANS - HOME SIDE RESTROOMS

SHEET NUMBER
E1.2

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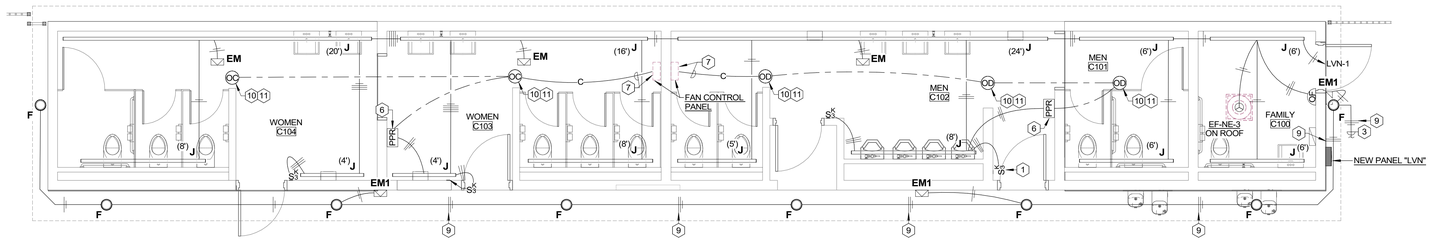
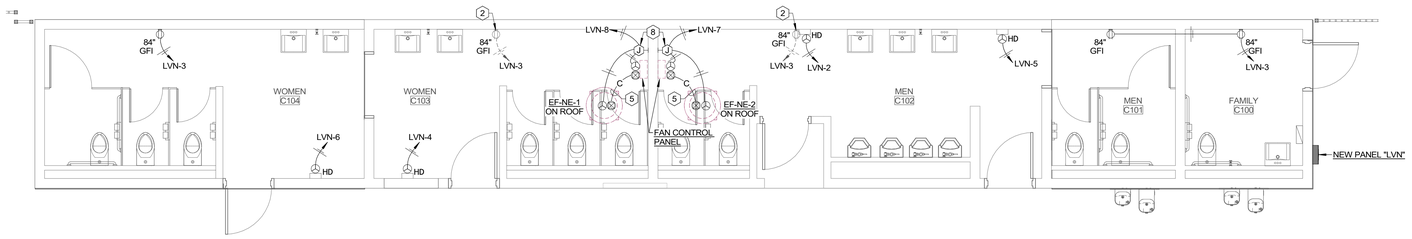


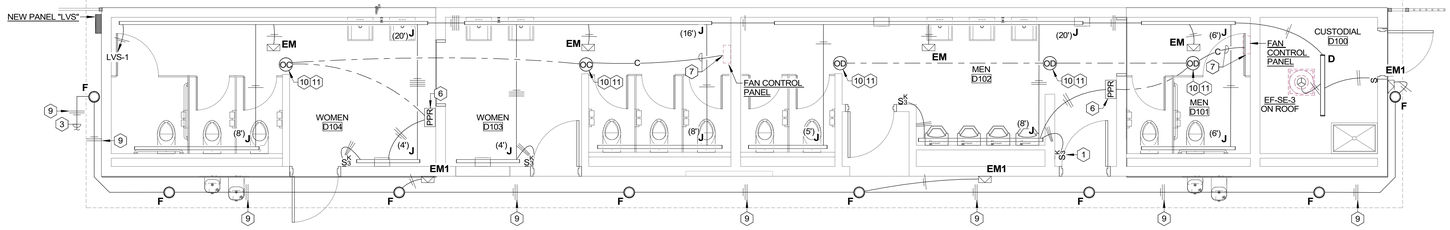
TRUE NORTH PLAN 1 ELECTRICAL LIGHTING FLOOR PLAN - VISITOR SIDE - RESTROOM NORTH EAST

1/4" = 1'-0"



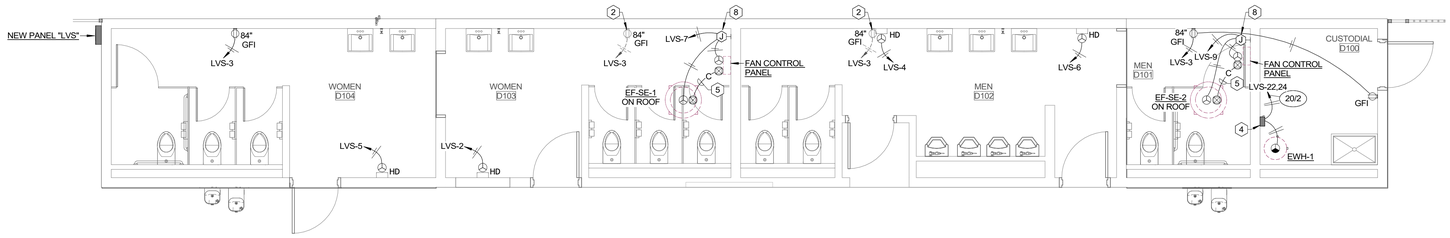
TRUE NORTH PLAN 2 ELECTRICAL POWER FLOOR PLAN - VISITOR SIDE - RESTROOM NORTH EAST

1/4" = 1'-0"



TRUE NORTH PLAN 3 ELECTRICAL LIGHTING FLOOR PLAN - VISITOR SIDE - RESTROOM SOUTH EAST

1/4" = 1'-0"



TRUE NORTH PLAN 4 ELECTRICAL POWER FLOOR PLAN - VISITOR SIDE - RESTROOM SOUTH EAST

1/4" = 1'-0"

GENERAL NOTES:

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D. MINIMUM CONDUCTOR SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS #10AWG UNLESS OTHERWISE INDICATED.
E. DEVICES INSTALLED AT EXISTING WALLS TO REMAIN SHALL UTILIZE SURFACE MOUNTED EMT CONDUIT, 1900 BOXES, AND INDUSTRIAL RAISED COVER PLATES. PAINT ALL VISIBLE ELECTRICAL COMPONENTS TO MATCH WALL SURFACE. REFER TO ARCHITECTURAL DRAWINGS FOR EXISTING / NEW WALL TYPES.
F. REFER TO SPECIFICATIONS FOR BOX AND CONDUIT REQUIREMENTS AT NEW WALLS.
G. REFER TO HVAC DRAWING DETAILS FOR REQUIREMENTS AT EXHAUST FANS.

KEYED NOTES:

1. INSTALL NEW LIGHTING CONTROL DEVICE AT EXISTING OUTLET BOX REMAINING FROM DEMOLITION. EXTEND NEW CONDUIT AND CABLE / CONDUCTORS AS INDICATED.
2. INSTALL NEW DEVICE AND COVER PLATE AT EXISTING OUTLET BOX REMAINING FROM DEMOLITION. TERMINATE AT EXISTING CONDUCTORS AS REQUIRED.
3. REFER TO E1.1 FOR CONTINUATION.
4. 30A, 240V., 2P, NF, NEMA-3R DISCONNECT SWITCH.
5. ROUTE ONE (1) 3/4" CONDUIT WITH PULLCORD FOR CONTROL CONDUCTORS BY HVAC CONTRACTOR.
6. SURFACE MOUNT JUNCTION BOX FOR DEVICE ON WALL BELOW GYPBOARD CEILING AT A MINIMUM OF 7' ABOVE FINISHED FLOOR ON WALL AS REQUIRED.
7. PROVIDE ONE (1) - 1/2" CONDUIT WITH TWO (2) - #16 CONDUCTORS FROM OCCUPANCY SENSOR "OC" / "OD" RELAY FOR CONTROL OF EXHAUST FAN (HIGH SPEED TRIGGER) WITHIN SPACE. ROUTE CONDUIT AND CONDUCTORS TO FAN CONTROL PANEL INDICATED AND TERMINATE TO FAN HIGH SPEED INPUT TERMINALS AS REQUIRED BY CONTROL PANEL WIRING DIAGRAMS.
8. SURFACE MOUNT JUNCTION BOX ON WALL AT ELEVATION / LOCATION SELECTED BY HVAC CONTRACTOR.
9. DERIVE UNSWITCHED CONDUCTOR FOR EMERGENCY LIGHTING FIXTURE TYPE "EM1" FROM LINE SIDE OF TIME CLOCK.
10. PARALLEL CONNECT OCCUPANCY SENSORS SUCH THAT ANY MOTION DETECTED ENABLES ALL LIGHT FIXTURES WITHIN SPACE.
11. PARALLEL CONNECT RELAY CONDUCTORS SUCH THAT ANY MOTION DETECTED ENABLES FAN HIGH SPEED.

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Corpus Christi, TX 78405-3678
Registration # F-006328

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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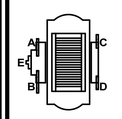
DATE ISSUED:
11/11/2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH / TRUE NORTH

SHEET NAME
ELECTRICAL FLOOR PLANS - VISITORS SIDE RESTROOMS

SHEET NUMBER
E1.3

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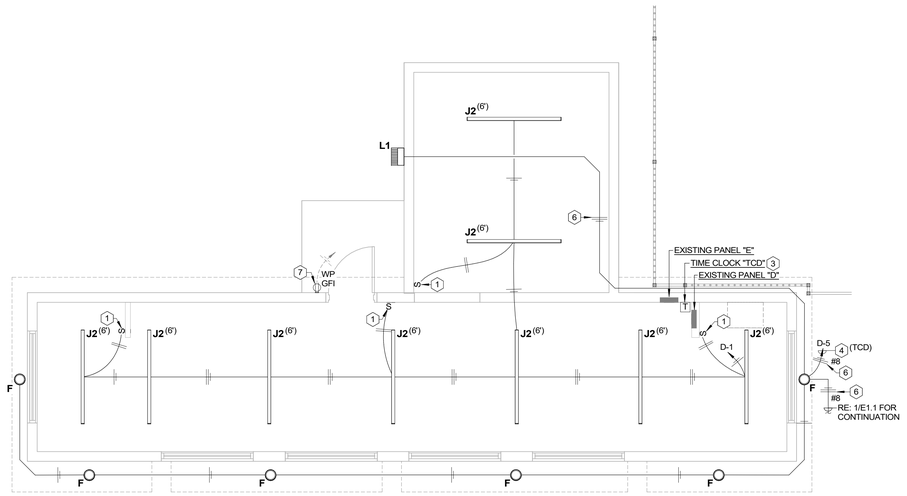
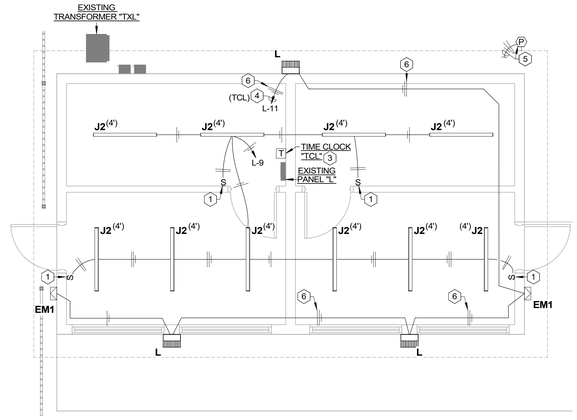
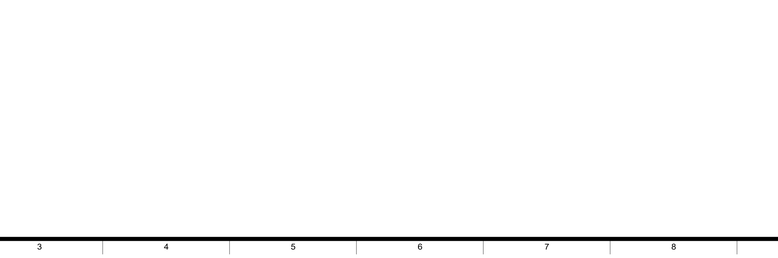


TRUE NORTH / PLAN NORTH — 1 — ELECTRICAL LIGHTING PLAN - HOMESIDE CONCESSION
1/4" = 1'-0"



TRUE NORTH / PLAN NORTH — 2 — ELECTRICAL LIGHTING PLAN - HOMESIDE BOOSTER
1/4" = 1'-0"



TRUE NORTH / PLAN NORTH — 3 — ELECTRICAL LIGHTING PLAN - VISITOR SIDE - CONCESSION
1/4" = 1'-0"

GENERAL NOTES:

A. INFORMATION INCLUDED ON THIS DRAWING IS INTENDED TO INDICATE THE GENERAL CHARACTER AND EXTENT OF WORK REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
B. ELECTRICAL PROJECT DESIGN IS BASED UPON 2020 NEC AND 2015 IECC.
C. ELECTRICAL RENOVATIONS FOR CONCESSION BUILDINGS AND BOOSTER BUILDING ARE LIMITED TO LIGHTING EXCEPT AS OTHERWISE SPECIFICALLY INDICATED. THE BALANCE OF ELECTRICAL SYSTEMS SHALL REMAIN AS IS EXCEPT AS OTHERWISE SPECIFICALLY INDICATED.
D. MINIMUM CONDUIT SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS 3/4" CONDUIT UNLESS OTHERWISE INDICATED.
E. MINIMUM CONDUCTOR SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS #10AWG UNLESS OTHERWISE INDICATED.
F. DEVICES INSTALLED AT EXISTING WALLS TO REMAIN SHALL UTILIZE SURFACE MOUNTED EMT CONDUIT, 1900 BOXES, AND INDUSTRIAL RAISED COVER PLATES. PAINT ALL VISIBLE ELECTRICAL COMPONENTS TO MATCH WALL SURFACE. REFER TO ARCHITECTURAL DRAWINGS FOR EXISTING / NEW WALL TYPES.
G. REFER TO SPECIFICATIONS FOR BOX AND CONDUIT REQUIREMENTS AT NEW WALLS.

KEYED NOTES:

1. INSTALL NEW LIGHTING CONTROL DEVICE AND COVERPLATE AT EXISTING OUTLET BOX REMAINING FROM DEMOLITION. EXTEND NEW CONDUIT AND CABLE / CONDUCTORS AS INDICATED.
2. INSTALL NEW DEVICE AND COVER PLATE AT EXISTING OUTLET BOX MOUNTED TO NEW FENCE. TERMINATE AT EXISTING CONDUCTORS AS REQUIRED.
3. TIME CLOCK SHALL BE INTERMATIC CAT. NO. T171.
4. ROUTE CONDUIT AND CONDUCTORS THROUGH TIME CLOCK (INDICATED).
5. PHOTOELECTRIC CELL SHALL BE INTERMATIC CAT. NO. EK4336SM. PROVIDE NEOPRENE GASKET. SERIES CONNECT WITH TIME CLOCK AS REQUIRED FOR PHOTOCELL "ON" / TIME CLOCK "OFF"
6. DERIVE UNSWITCHED CONDUCTOR FOR EMERGENCY BATTERY PACK IN LIGHTING FIXTURE TYPES "EM1" AND "L1" FROM LINE SIDE OF TIME CLOCK.
7. SURFACE MOUNT DEVICE AT EXISTING PENETRATION REMAINING FROM DEMOLITION. TERMINATE AT EXISTING CONDUCTORS AS REQUIRED. SEAL PENETRATION WATERTIGHT AND RODENTPROOF.

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STATE OF TEXAS — SCOTT E. STRIDDE — 84831 — LICENSED PROFESSIONAL ENGINEER
11/11/2025

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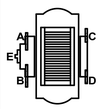

PLAN NORTH / TRUE NORTH

SHEET NAME
ELECTRICAL FLOOR PLANS - CONCESSION BUILDINGS
SHEET NUMBER

E1.4

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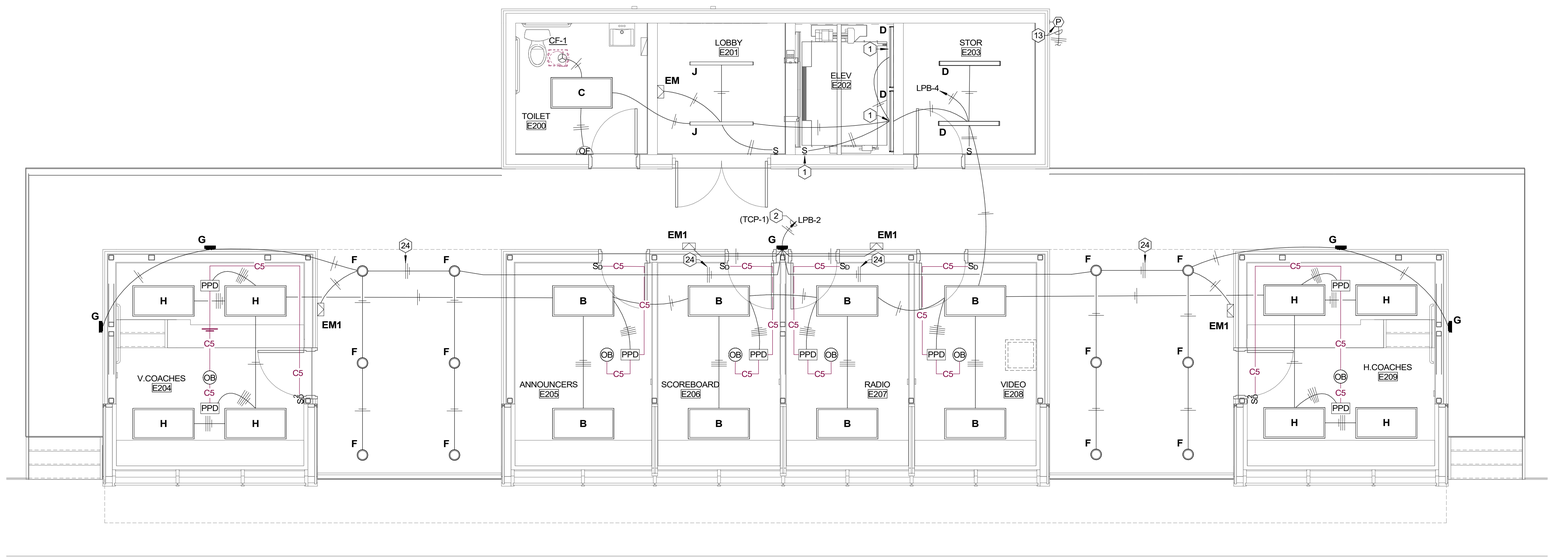
GENERAL NOTES:

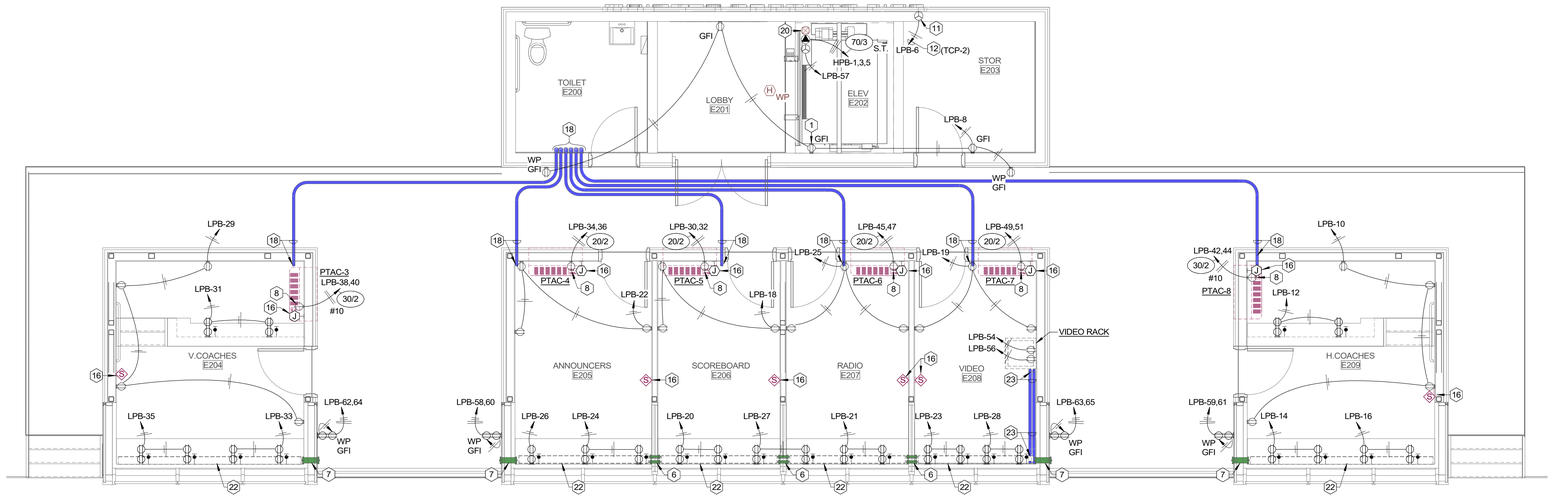
A. INFORMATION INCLUDED ON THIS DRAWING IS INTENDED TO INDICATE THE GENERAL CHARACTER AND EXTENT OF WORK REQUIRED. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
B. ELECTRICAL PROJECT DESIGN IS BASED UPON 2020 NEC AND 2015 IECC.
C. MINIMUM CONDUIT SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS 3/4" CONDUIT UNLESS OTHERWISE INDICATED.
D. MINIMUM CONDUCTOR SIZE FOR EXTERIOR / IN SLAB (IS) / UNDERGROUND (UG) INSTALLATION IS #10AWG UNLESS OTHERWISE INDICATED.

KEYED NOTES:

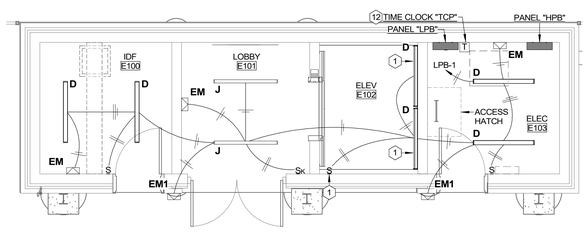
1. COORDINATE DEVICE MOUNTING ELEVATION / LOCATION WITHIN ELEVATOR PIT WITH ELEVATOR EQUIPMENT INSTALLER.
2. ROUTE CONDUIT AND CONDUCTORS THROUGH TIME CLOCK LOAD POLE (INDICATED).
3. SUMP PUMP CONTROLLER. PROVIDE CONDUIT AND CONDUCTORS TO SUMP PUMP SIGNALING DEVICE. COORDINATE REQUIREMENTS WITH VENDOR FURNISHED WIRING DIAGRAMS.
4. PROVIDE FLUSH MOUNTED BOX FOR SUMP PUMP SIGNALING DEVICE FURNISHED BY PLUMBING CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR. COORDINATE ELEVATION AND TERMINATION REQUIREMENTS WITH PLUMBING CONTRACTOR.
5. MOUNT DEVICE FOR SUMP PUMP SIGNALING DEVICE AT SAME ELEVATION OF SUCH DEVICE. COORDINATE ELEVATION WITH PLUMBING LOCATION.
6. PROVIDE TWO (2) - 2" CONDUIT THROUGH WALL WITH LEGRAND ON-Q MINI PASS THROUGH GROMMETS (ON EACH END) FOR EACH CONDUIT. INSTALL CONDUIT AT SAME ELEVATION OF WIRE BASKET CABLE TRAY BELOW COUNTER.
7. PROVIDE 4" CONDUIT THROUGH WALL. PROVIDE THREADED CAPS ON EACH END OF CONDUIT. INSTALL CONDUIT AT 18" ABOVE FINISHED FLOOR TO BOTTOM OF CONDUIT.
8. REFER TO MECHANICAL SCHEDULE FOR DEVICE CONFIGURATION. COORDINATE MOUNTING ELEVATION / LOCATION WITH HVAC CONTRACTOR.
9. PROVIDE GROUND BAR WITH MINIMUM TWENTY-FIVE (25) - #6 MAX RATED LUG BARRELS AND ISOLATORS TO STAND BAR OFF WALL.
10. #6 GROUND IN 1/2" CONDUIT ROUTED TO PANEL "LPB". TERMINATE AT GROUND BAR AS REQUIRED.
11. PROVIDE POWER CONNECTION TO BACK-LIT SIGNAGE. COORDINATE TERMINATION ELEVATION(S) / LOCATION(S) WITH SIGN VENDOR / ARCHITECT.
12. TIME CLOCK "TCP" SHALL BE INTERMATIC CAT. NO. T173R.
13. PHOTOELECTRIC CELL SHALL BE INTERMATIC CAT. NO. EK4436SM. PROVIDE NEOPRENE GASKET. SERIES CONNECT WITH TIME CLOCK AS REQUIRED FOR PHOTOCELL ON / TIME CLOCK "OFF".
14. 60A., 240V., 2P, NF, NEMA-1 DISCONNECT SWITCH.
15. 60A., 240V., 2P, NF, NEMA-3R DISCONNECT SWITCH.
16. PROVIDE SINGLE GANG FLUSH OUTLET BOX WITH ONE (1) - 3/4" CONDUIT WITH PULLCORD TO ABOVE ACCESSIBLE CEILING. COORDINATE ELEVATION / LOCATION WITH HVAC CONTRACTOR.
17. NOT USED.
18. ONE (1) - 2" CONDUIT WITH PULLCORD ROUTED UP FROM IDF E100 EXPOSED ON WALL. ROUTE CONDUIT SECURED TO BOTTOM OF PRESS BOX STRUCTURE AS INDICATED. STUB CONDUIT ABOVE ACCESSIBLE CEILING AT LOCATION INDICATED.
19. SIX (6) - 2" CONDUIT WITH PULLCORD (IN EACH) ROUTED DOWN FROM PRESS BOX ABOVE (REFER TO KEYED NOTE 18) EXPOSED ON WALL. STUB CONDUIT AT BASKET CABLE TRAY BY KEYED NOTE 21.
20. PROVIDE FIRE ALARM CONNECTION AT ELEVATOR CONTROL PANEL WITHIN IN SHAFT.
21. 12" WIDE WIRE BASKET CABLE TRAY. SUSPEND 1'-0" BELOW CEILING. PROVIDE ALL ACCESSORIES REQUIRED. REFER TO SPECIFICATIONS FOR REQUIREMENTS.
22. 6" WIDE WIRE BASKET CABLE TRAY. INSTALL BELOW COUNTER TOP AT ELEVATION SELECTED BY ARCHITECT / OWNER. PROVIDE ALL REQUIRED MOUNTING ACCESSORIES.
23. TWO (2) - 2" CONDUIT WITH PULLCORD ROUTED SECURED TO BOTTOM OF PRESS BOX STRUCTURE. STUB CONDUIT AT 2" ABOVE FINISHED FLOOR AT VIDEO RACK AND BELOW COUNTER.
24. DERIVE UNSWITCHED CONDUCTOR FOR LIGHTING FIXTURE TYPE "EM1" FROM LINE SIDE OF TIME CLOCK "TCP".
25. PROVIDE SINGLE GANG FLUSH OUTLET BOX (BELOW PTAC UNIT FOR CONTROL CABLING) WITH ONE (1) - 3/4" CONDUIT WITH PULLCORD ROUTED CONCEALED IN WALL TO SINGLE GANG FLUSH OUTLET BOX (FOR REMOTE HVAC SENSOR). COORDINATE OUTLET BOX ELEVATIONS / LOCATIONS WITH HVAC CONTRACTOR PRIOR TO ROUGH-IN.



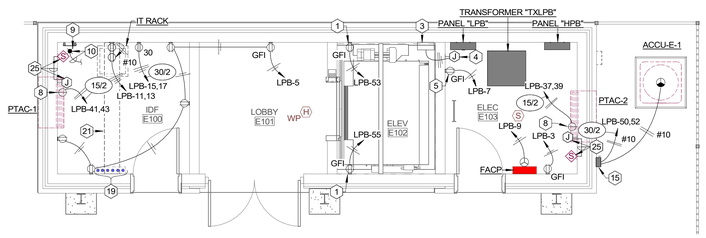
1 ELECTRICAL LIGHTING FLOOR PLAN - PRESS BOX
1/4" = 1'-0"



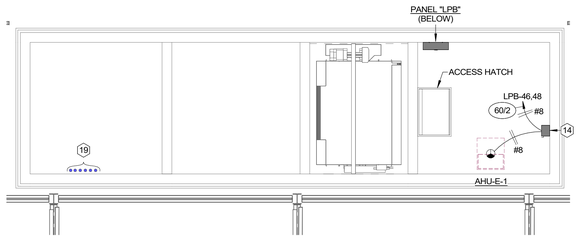
2 ELECTRICAL POWER FLOOR PLAN - PRESS BOX
1/4" = 1'-0"



3 ELECTRICAL LIGHTING FLOOR PLAN - GROUND FLOOR
1/4" = 1'-0"



4 ELECTRICAL POWER FLOOR PLAN - GROUND FLOOR
1/4" = 1'-0"



5 ELECTRICAL FLOOR PLAN - MECHANICAL MEZZANINE
1/4" = 1'-0"

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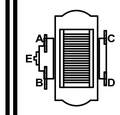

PLAN NORTH
TRUE NORTH

SHEET NAME
ELECTRICAL FLOOR PLANS - PRESS BOX

SHEET NUMBER
E1.5

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ELECTRICAL LEGEND

NOTE: THIS IS A STANDARD LEGEND. ALL SYMBOLS AND ABBREVIATIONS HEREIN MAY NOT BE APPLICABLE TO THIS PROJECT.

SYMBOL	DESCRIPTION
	CEILING OUTLET WITH FIXTURE AS SCHEDULED
	WALL OUTLET WITH SURFACE MOUNTED FIXTURE AS SCHEDULED
	CEILING OUTLET WITH FIXTURE AS SCHEDULED
	WALL OUTLET WITH SURFACE MOUNTED FIXTURE AS SCHEDULED
	TRACK LIGHTING WITH TRACK AS SCHEDULED
	INDICATES SCHEDULED FIXTURE ON EMERGENCY CIRCUIT
S	WALL SWITCH - REFER TO WIRING DEVICE SCHEDULE
	RECEPTACLE - REFER TO WIRING DEVICE SCHEDULE
	MANUAL MOTOR STARTER, SURFACE MOUNTED
	MANUAL MOTOR STARTER, FLUSH MOUNTED
	MAGNETIC MOTOR STARTER
C R	CONTACTOR - C, RELAY - R
	DISCONNECT SWITCH
	COMBINATION MOTOR STARTER/DISCONNECT SWITCH - REFER TO DRAWING NOTES FOR REQUIREMENTS
P	PHOTOELECTRIC SWITCH - REFER TO DRAWING NOTES FOR REQUIREMENTS
T	CONTROL TIME CLOCK - REFER TO DRAWING NOTES FOR REQUIREMENTS
J	JUNCTION BOX
	120 VOLT SINGLE PHASE CONNECTION TO EQUIPMENT NOTED
	208 VOLT OR 240 VOLT SINGLE PHASE CONNECTION TO EQUIPMENT NOTED
	208 VOLT OR 240 VOLT THREE PHASE CONNECTION TO EQUIPMENT NOTED
	277 VOLT SINGLE PHASE CONNECTION TO EQUIPMENT NOTED
	480 VOLT THREE PHASE CONNECTION TO EQUIPMENT NOTED
	CONTROL OUTLET AND CONNECTIONS AS REQUIRED
	COMBINATION TELEPHONE/DATA TRANSMISSION OUTLET BOX WITH 1" CONDUIT STUB - REFER TO SPECIFICATIONS FOR REQUIREMENTS
TV	TELEVISION OUTLET BOX - REFER TO SPECIFICATIONS FOR REQUIREMENTS
	SINGLE COMPARTMENT FLOOR BOX - REFER TO DRAWING NOTES FOR REQUIREMENTS
	MULTI-COMPARTMENT FLOOR BOX - REFER TO DRAWING NOTES FOR REQUIREMENTS
	BUZZER
FA	FIRE ALARM SYSTEM HEAT DETECTOR
FMS	FIRE ALARM SYSTEM MANUAL STATION
FACP	FIRE ALARM SYSTEM CONTROL PANEL
FAPS	FIRE ALARM SYSTEM POWER SUPPLY
FV	FIRE ALARM SYSTEM VOICE EVACUATION PANEL
FA	FIRE ALARM SYSTEM REMOTE ANNUNCIATOR
S	FIRE ALARM SYSTEM SMOKE DETECTOR
F	FIRE ALARM SYSTEM SPEAKER
FS	FIRE ALARM SYSTEM COMBINATION SPEAKER/STROBE
FH	FIRE ALARM SYSTEM EXTERIOR HORN
FS	FIRE ALARM SYSTEM COMBINATION HORN/STROBE (C-CEILING)
S	FIRE ALARM SYSTEM DUCT SMOKE DETECTOR
	FIRE ALARM SYSTEM DOOR HOLDER
WP	WEATHERPROOF DEVICE OR ENCLOSURE

SYMBOL	DESCRIPTION
	RACEWAY WITH NUMBER OF CONDUCTORS INDICATED
#G	RACEWAY IN CONCRETE FLOOR SLAB AND/OR WALLS WITH NUMBER OF CONDUCTORS INDICATED
UG	UNDERGROUND RACEWAY
A1,2	PANEL AND CIRCUIT NUMBERS
	ARROWS INDICATE HOME RUN TO PANEL
1"	CONDUIT SIZE IF INDICATED
3/0	BRANCH CIRCUIT BREAKER SIZE IN PANEL INDICATED IF OTHER THAN 1P/20A
	NEUTRAL CONDUCTOR
	UNGROUNDED CONDUCTORS
	CONDUCTOR SIZE INDICATED IF OTHER THAN NO. 12 AWG
#10	CONDUCTORS SHALL BE SIZE INDICATED FOR ENTIRE LENGTH OF CIRCUIT
	INDICATES EMERGENCY LIGHTING CIRCUIT
C	CONTROL SYSTEM RACEWAY AND/OR CONDUCTORS - REFER TO SPECIFICATIONS FOR REQUIREMENTS
	CONDUIT CONTINUATION TO POINT NOTED
	ELECTRICAL BRANCH CIRCUIT PANEL AS NOTED
	DISTRIBUTION PANEL OR SWITCHBOARD AS NOTED
	TELEPHONE BOARD
S	INTERCOMMUNICATION SYSTEM CEILING MOUNTED SPEAKER
S	INTERCOMMUNICATION SYSTEM WALL MOUNTED SPEAKER
S BR	INTERCOMMUNICATION SYSTEM GYPBOARD MOUNTED SPEAKER
S	INTERCOMMUNICATION SYSTEM WALL MOUNTED BI-DIRECTIONAL SPEAKER
S	INTERCOMMUNICATION SYSTEM WALL MOUNTED EXTERIOR SPEAKER HORN
HS	INTERCOMMUNICATION SYSTEM STAFF HAND SET
HS	INTERCOMMUNICATION SYSTEM CALL-IN SWITCH
ACS	INTERCOMMUNICATION SYSTEM ADMINISTRATIVE CONTROL STATION
P	INTERCOMMUNICATION SYSTEM PROCESSING UNIT
M	PUBLIC ADDRESS SYSTEM MICROPHONE OUTLET
AMP	PUBLIC ADDRESS SYSTEM AMPLIFIER
HD	HAND DRYER
DM	DOOR MOTOR CONNECTION
VFD	VARIABLE FREQUENCY DRIVE
FPB	FAN POWERED BOX
AHU	AIR HANDLING UNIT
EDH	ELECTRC DUCT HEATER
EWC	ELECTRC WATER COOLER
EWH	ELECTRC WATER HEATER
HWCP	HOT WATER CIRCULATION PUMP
DH	DEHUMIDIFIER

WIRING DEVICE LEGEND AND SCHEDULE

SYMBOL	CHARACTERISTICS	RATING VOLTS	RATING AMPS	DESCRIPTION	MANUFACTURER'S REFERENCE P. & S.	HUBBELL	LEVITON	REMARKS
	NEMA 5-20R	125	20	DUPLEX CONVENIENCE OUTLET	5362A	HBL5366	5366	
GFI	NEMA 5-20R	125	20	GFI RECEPTACLE	2095	GF5362	7899	
	NEMA 5-20R	125	20	SINGLE OUTLET RECEPTACLE	5361L	HBL5361	5361	
C	NEMA 5-15R	125	15	CLOCK OUTLET RECEPTACLE	5373SSS	HBL5235	5261-CH	
WP GFI	NEMA 5-20R	125	20	WEATHERPROOF GFI CONVENIENCE RECEPTACLE	2095	GF5362	7899	
30	NEMA 5-30R	125	30	HEAVY DUTY CONVENIENCE OUTLET	3802	HBL9308	5371	
	NEMA-5-20R WITH USB	125	20	DUPLEX CONVENIENCE OUTLET WITH INTEGRAL USB PORT / CHARGER	-	USB8300I	TS832 HCI	
20	NEMA 14-20R	125/250	20	SINGLE PHASE, 4-WIRE, 3-POLE, GROUNDING LIGHT DUTY RECEPTACLE	3820	HBL8410	-	
30	NEMA 14-30R	125/250	30	SINGLE PHASE, 4-WIRE, 3-POLE, GROUNDING MED. DUTY RECEPTACLE	3864	HBL9430A	278	
50	NEMA 14-50R	125/250	50	SINGLE PHASE, 4-WIRE, 3-POLE, GROUNDING HEAVY DUTY RECEPTACLE	3894	HBL9450A	279	
60	NEMA 14-60R	125/250	60	SINGLE PHASE, 4-WIRE, 3-POLE, GROUNDING HEAVY DUTY RECEPTACLE	-	HBL9460A	9460A	
20	NEMA 18-20R	120/208	20	THREE PHASE, 4-WIRE, 4-POLE RECEPTACLE	3822	HBL7250	7250-FR	
30	NEMA 18-30R	120/208	30	THREE PHASE, 4-WIRE, 4-POLE RECEPTACLE	-	HBL8330A	8330-A	
50	NEMA 18-50R	120/208	50	THREE PHASE, 4-WIRE, 4-POLE RECEPTACLE	-	HBL8350A	8350-A	
60	NEMA 18-60R	120/208	60	THREE PHASE, 4-WIRE, 4-POLE RECEPTACLE	3870	HBL7301A	8360-A	
	NEMA 5-20R	125	20	ISOLATED GROUND RECEPTACLE - ORANGE	IG6300	IG5362	5362IG	
	NEMA 5-20R	125	20	SAFETY RECEPTACLE	TR53	CR20ALTR	CR20S-G	
	NEMA 5-20R	125	20	TVSS RECEPTACLE IVORY	5362BLSP	IG5362SA	5380-IGB	

NOTE: THIS IS A STANDARD LEGEND. ALL SYMBOLS AND ABBREVIATIONS HEREIN MAY NOT BE APPLICABLE TO THIS PROJECT.

LIGHTING CONTROL SCHEDULE

MARK	DESCRIPTION	MANUFACTURER/ MODEL NO.
PPD	POWER / CONTROL DIMMING PACK	nLIGHT NO. nPP16D EFP
PPR	POWER / CONTROL MODULE	nLIGHT NO. nPP PD EFP
PPT	LINE VOLTAGE POWER / CONTROL MODULE	nLIGHT NO. nPP PCD EFP
PPE	POWER / CONTROL DIMMING PACK EMERGENCY CIRCUIT	nLIGHT NO. nPP16D ER EFP
PRE	POWER / CONTROL MODULE EMERGENCY CIRCUIT	nLIGHT NO. nPP16 ER EFP
PTE	LINE VOLTAGE POWER / CONTROL MODULE EMERGENCY CIRCUIT	nLIGHT NO. nPP PCD ER EFP
OA	CEILING MOUNTED OCCUPANCY SENSOR "A"	nLIGHT NO. nCM PDT 10 RJB
OB	CEILING MOUNTED OCCUPANCY SENSOR "B"	nLIGHT NO. nCM PDT 9 RJB
OC	CEILING MOUNTED OCCUPANCY SENSOR "C"	SENSOR SWITCH NO. CM PDT 10 R LT
OD	CEILING MOUNTED OCCUPANCY SENSOR "D"	SENSOR SWITCH NO. CM PDT 9 R LT
PA	CEILING MOUNTED OCCUPANCY SENSOR "A" WITH PHOTOELECTRIC SENSOR	nLIGHT NO. nCM PDT 10 ADCX RJB
PB	CEILING MOUNTED OCCUPANCY SENSOR "B" WITH PHOTOELECTRIC SENSOR	nLIGHT NO. nCM PDT 9 ADCX RJB
PE	CEILING MOUNTED PHOTOELECTRIC SENSOR	nLIGHT NO. nCM ADCX RJB
OF	WALL MOUNTED OCCUPANCY SENSOR "F"	nLIGHT NO. WSXA PDT **
T	ELECTRONIC TIMER SWITCH	SENSOR SWITCH NO. PTSA 60 **

MARK	DESCRIPTION	MANUFACTURER / MODEL NO.
S	SINGLE POLE SINGLE THROW SWITCH	HUBBELL NO. CS8120 LEVITON NO. CS81-20
S_2	SINGLE POLE DOUBLE THROW SWITCH	HUBBELL NO. CS8220 LEVITON NO. CS82-20
S_3	3-WAY SWITCH	HUBBELL NO. CS8320 LEVITON NO. CS83-20
S_4	4-WAY SWITCH	HUBBELL NO. CS8420 LEVITON NO. CS84-20
S_K	KEYED SINGLE POLE SINGLE THROW SWITCH	HUBBELL NO. HBL1221-L LEVITON NO. 1221-2
S_3^K	KEYED 3-WAY SWITCH	HUBBELL NO. HBL1223-L LEVITON NO. 1223-2
S_4^K	KEYED 4-WAY SWITCH	HUBBELL NO. HBL1224-L LEVITON NO. 1224-2
S_P	SINGLE POLE PILOT SWITCH	HUBBELL NO. HBL12211LC (NORMALLY OFF) LEVITON NO. 1221-PL (NORMALLY OFF)
S_{WP}	SINGLE POLE WEATHERPROOF SWITCH	HUBBELL NO. CS8120 LEVITON NO. CS81-120
S_D	ELECTRONIC DIMMER SWITCH	nLIGHT NO. nPODMA DX **(**-COLOR BY ARCHITECT)
S_D^2	ELECTRONIC DIMMER SWITCH	nLIGHT NO. nPODMA DX.2P **(**-COLOR BY ARCHITECT)
S_D^3	ELECTRONIC DIMMER SWITCH	nLIGHT NO. nPODMA DX 3P **(**-COLOR BY ARCHITECT)
S_D^4	ELECTRONIC DIMMER SWITCH	nLIGHT NO. nPODMA DX 4P **(**-COLOR BY ARCHITECT)
S_M	ELECTRONIC WALL SWITCH	nLIGHT NO. nPODM **(**-COLOR BY ARCHITECT)
	THREE (3) CONDUCTOR PLENUM RATED LOW VOLTAGE CABLE AS RECOMMENDED BY OCCUPANCY SENSOR MANUFACTURER.	
C5	CATEGORY 5 PLENUM RATED CABLE	

LIGHTING CONTROL GENERAL NOTES:
1. OCCUPANCY SENSOR LOCATIONS INDICATED ON THE DRAWINGS ARE SCHEMATIC.
2. CEILING MOUNTED MOTION SENSORS IN SPACES SHALL BE MOUNTED AS NEAR THE CENTER OF ROOM AS IS POSSIBLE.
3. WALL MOUNTED MOTION SENSORS MARK "OF" SHALL BE MOUNTED AS NEAR TO THE STRIKE SIDE OF DOORS AS IS POSSIBLE.
4. INSTALL MOTION SENSOR IN RESTROOMS AT LOCATION SELECTED BY MANUFACTURER.
5. ALL MOTION SENSORS SHALL BE INSTALLED OR MOUNTED TO A JUNCTION BOX.
6. ALL MOTION SENSORS SHALL BE MOUNTED AT LEAST 4'-0" AWAY FROM HVAC SUPPLY GRILLES.
7. ALL OCCUPANCY SENSOR AND POWER PACK TERMINATIONS SHALL BE MADE IN AN APPROVED JUNCTION BOX.
8. POWER PACKS ARE LISTED AS CLASS 2 ELECTRICAL CIRCUITS. PER NEC CODE CLASS 2, ELECTRICAL CIRCUITS MUST ADHERE TO ALL ARTICLES IN THE CODE. ALL SPLICES FOR CLASS 2 ELECTRICAL CIRCUITS SHALL BE IN AN APPROVED BOX OR CONDUIT BODY PER ARTICLE 200.15 IN NEC (NFPA 70) CODE BOOK.
9. SWITCHPLATE COVER COLORS SHALL BE SELECTED BY ARCHITECT UNLESS OTHERWISE INDICATED.

LIGHTING FIXTURE SCHEDULE

MARK	BRAND	CATALOG REFERENCE	LAMPS	BALLAST / DRIVER VOLTAGE	BODY	DIFFUSER	MOUNTING	REMARKS
A	LITHONIA	VCPG LED V4 P5 40K 80CRI T5W SRM WG DNAXD	LED FURNISHED 82[W], 40K	MVOLT	DIE-CAST ALUMINUM	PRECISION MOLDED ACRYLIC	SURFACE	
B	LITHONIA	CPX 2x4 4000LM 80CRI 40K SWL MIN10 ZT	LED FURNISHED 37[W], 40K	MVOLT	EXTRUDED ALUMINUM	SATIN WHITE	RECESSED	
C	LITHONIA	CPX 2x4 3000LM 80CRI 40K SWL MIN10 ZT DGA24	LED FURNISHED 25[W], 40K	MVOLT	EXTRUDED ALUMINUM	SATIN WHITE	RECESSED	PROVIDE WITH DRYWALL GRID ADAPTER.
D	LITHONIA	CLX L48 4000LM SEF FDL EZ1 40K 80CRI MB MSDPDT7	LED FURNISHED 35[W], 40K	MVOLT	MATTE BLACK	DIFFUSED ACRYLIC	SURFACE / WALL	WITH INTEGRAL OCCUPANCY SENSOR. COORDINATE LOCATION WITH HVAC DUCTING, PIPING ETC.
EM	LITHONIA	ELM2L B	LED FURNISHED	NONE	BLACK THERMOPLASTIC	ACRYLIC	SURFACE / WALL	PROVIDE WITH FACTORY INSTALLED EMERGENCY BATTERY PACK AND TEST SWITCH.
EM1	LITHONIA	AFF OEL DDBXTD LTP SDRT WT	LED FURNISHED	NONE	DARK BRONZE	ACRYLIC	SURFACE	PROVIDE WITH FACTORY INSTALLED EMERGENCY BATTERY PACK AND TEST SWITCH.
F	LUMINIS	SN800C L1L11 40K SWK BZT MG	LED FURNISHED 14[W], 40K	MVOLT	BRONZE	TEMPERED GLASS	SURFACE	
G	LUMINIS	SN805 L1L8 40K SWK BZT MG	LED FURNISHED 19[W], 40K	MVOLT	BRONZE	TEMPERED GLASS	SURFACE / WALL	MOUNT FIXTURE AT 8' ABOVE FINISHED FLOOR TO CENTER OF FIXTURE..
H	LITHONIA	CPX 2x4 3000LM 80CRI 40K SWL MIN10 ZT	LED FURNISHED 25[W], 40K	MVOLT	EXTRUDED ALUMINUM	SATIN WHITE	RECESSED	
J	AXIS LIGHTING	EX2S 300 80 40 ASO ** BLK UNV DP 1 SB	LED FURNISHED 2.85[W/FT], 40K	UNV	BLACK EXTRUDED ALUMINUM	EXTRUDED ACRYLIC	SURFACE	INSTALL FIXTURE SUCH THAT ASYMMETRIC THROW IS AIMED TOWARDS CENTER OF SPACE. FIXTURE LENGTH AS INDICATED ON DRAWINGS. PROVIDE WITH ALL HARDWARE AND CONNECTORS FOR CONTINUOUS ROWS INDICATED ON DRAWINGS.
J2	AXIS LIGHTING	EX2S 750 80 40 SO ** BLK UNV DP 1 SB	LED FURNISHED 7.4[W/FT], 40K	UNV	BLACK EXTRUDED ALUMINUM	EXTRUDED ACRYLIC	SURFACE	FIXTURE LENGTH AS INDICATED ON DRAWINGS.
K	LITHONIA	CLX L48 5000LM SEF FDL EZ1 40K 80CRI MB MSDPDT7	LED FURNISHED 36[W], 40K	MVOLT	MATTE BLACK	DIFFUSED ACRYLIC	SURFACE / WALL	WITH INTEGRAL OCCUPANCY SENSOR. COORDINATE LOCATION WITH HVAC DUCTING, PIPING ETC.
L	LITHONIA	DSXW1 LED P1 40K 80CRI T2S BBW BSW DDBXD	LED FURNISHED 12[W], 50K	MVOLT	DARK BRONZE	PRECISION MOLDED ACRYLIC	SURFACE / WALL	PROVIDE WITH BIRD DETERRENT SPIKES. INSTALL AT ELEVATION SELECTED BY ARCHITECT.
L1	LITHONIA	DSXW1 LED P1 40K 80CRI T2S BBW E10WH BSW DDBXD	LED FURNISHED 12[W], 50K	MVOLT	DARK BRONZE	PRECISION MOLDED ACRYLIC	SURFACE / WALL	PROVIDE WITH FACTORY INSTALLED BATTERY PACK AND BIRD DETERRENT SPIKES. INSTALL AT ELEVATION SELECTED BY ARCHITECT.
M	ECOSENSE	L60 - E - 48 - 12 - 40 - 80 - MULT - ASYM - K	LED FURNISHED 48[W], 40K	MVOLT	BLACK	POLYCARBONATE	SURFACE	PROVIDE WITH ECOSENSE CAT. NO. *L45L60-A-WMA-CA-24-K 2'* BLACK WALL ARM MOUNT. SECURE TO WALL AND AIM FIXTURE AS REQUIRED TO ILLUMINATE WILDCAT LOGO.

MINIMUM FAULT CURRENT RATINGS

277/480V. GEAR	18 [KA] A.I.C.
120/240V. GEAR	10 [KA] A.I.C.

*FAULT CURRENT RATINGS ABOVE SHALL BE REQUIRED UNLESS OTHER FAULT CURRENT RATINGS ARE INDICATED

TOTAL ADDITIVE CONNECTED LOAD SUMMARY

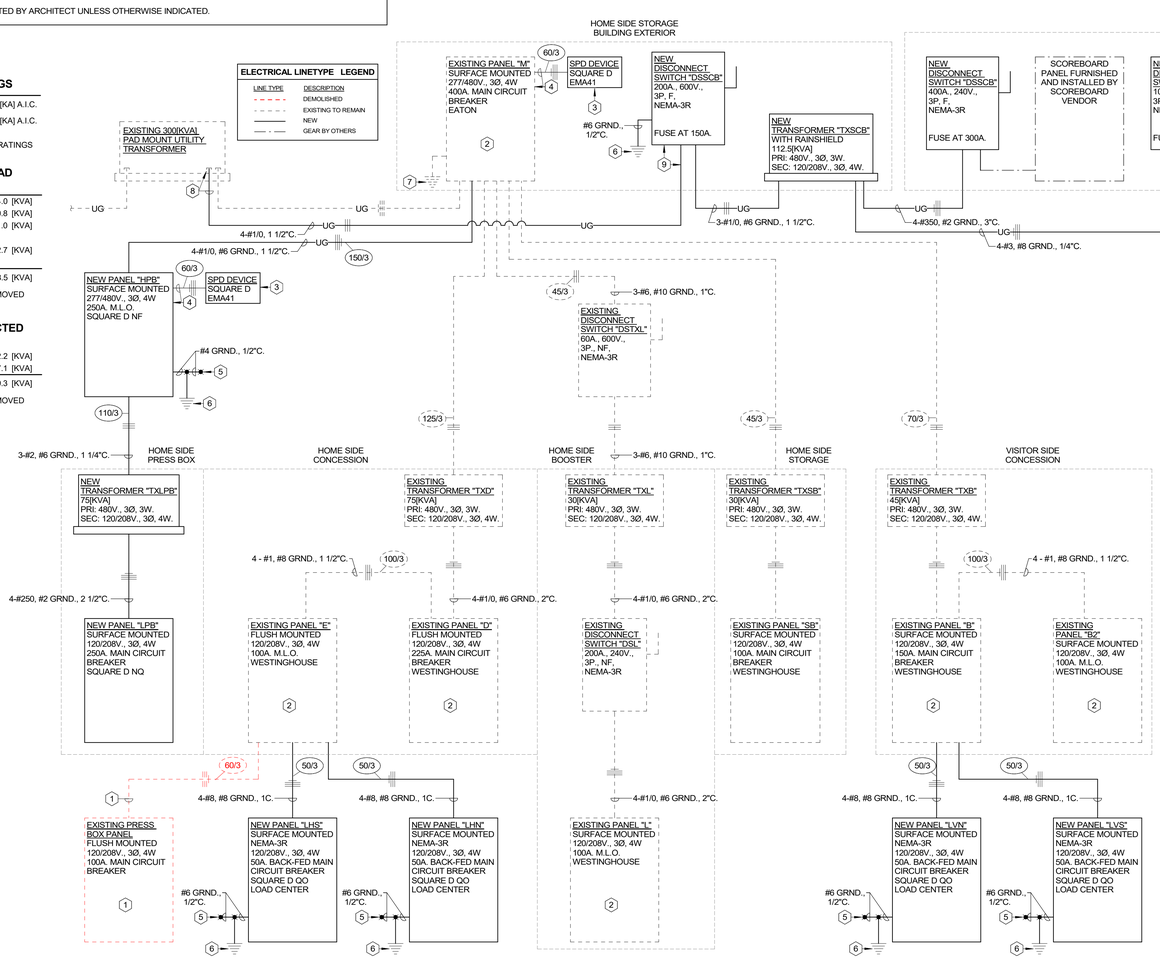
LIGHTING	4.0 [KVA]
*MISC. 1Ø	30.8 [KVA]
MISC. EQUIPMENT	41.0 [KVA]
A/C LOADS:	
HEATING	32.7 [KVA]
COOLING 13.9 [KVA]	
TOTAL CONNECTED LOAD	108.5 [KVA]

*N.E.C. PERMITTED DIVERSITY HAS BEEN REMOVED FROM LOAD QUANTITY INDICATED.

TRANSFORMER "TXSCB" CONNECTED LOAD SUMMARY

*MISC. 1Ø	2.2 [KVA]
MISC. EQUIPMENT	77.1 [KVA]
TOTAL CONNECTED LOAD	79.3 [KVA]

*N.E.C. PERMITTED DIVERSITY HAS BEEN REMOVED FROM LOAD QUANTITY INDICATED.



1 ELECTRICAL POWER RISER DIAGRAM
N.T.S.

KEYED NOTES:
1. EXISTING PANEL TO BE REMOVED. REMOVE CONDUIT AND CONDUCTORS TO SOURCE.
2. INSTALL NEW CIRCUIT BREAKER(S) AND / OR MODIFY EXISTING CIRCUIT BREAKER(S) AS INDICATED ON RISER DIAGRAM / PANELBOARD SCHEDULE. JOBSITE SURVEY CIRCUIT BREAKER MANUFACTURER.
3. MOUNT ADJACENT TO OR ABOVE GEAR TO BE PROTECTED. CONDUCTOR LENGTH SHALL BE AS SHORT AS POSSIBLE.
4. PROVIDE CIRCUIT BREAKER, CONDUIT, AND CONDUCTORS REQUIRED BY SURGE PROTECTION DEVICE.
5. PROVIDE GROUND BOND TO BUILDING STEEL AND WATER MAIN AS REQUIRED BY NFPA 70.
6. 3/4" X 10' COPPER GROUND ROD. EXOTHERMICALLY CONNECT GROUNDING CONDUCTOR TO GROUND ROD.
7. EXISTING SERVICE GROUND TO REMAIN. PROVIDE CONNECTIONS TO AND EXTENSIONS FROM EXISTING SERVICE GROUND AS SPECIFIED AND AS REQUIRED BY THE N.E.C.
8. TUNNEL UNDER EXISTING PAD AS REQUIRED TO ROUTE CONDUIT BELOW PAD. STUB CONDUIT INTO TRANSFORMER SECONDARY COMPARTMENT AS DIRECTED BY AEP.
9. BOND NEUTRAL FROM PAD MOUNTED TRANSFORMER AT DISCONNECT SWITCH.

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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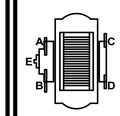
DATE ISSUED:
11/11/2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
ELECTRICAL LEGENDS AND SCHEDULES

SHEET NUMBER
E5.1

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PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: LUGS | VOLTAGE: 277/480 | THREE PHASE | CAPACITY: 400 AMPS

PANEL: M | SPECIAL FEATURES: EATON PANEL

CKT	LOAD	C/B	LIGHTING EQPM.	MISC 1Ø EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING EQPM.	MISC 1Ø EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1									2								
3	SPAD	60/3							4	PANEL HPB	150/3*	2,235	29,817	35,000	0	0	13,870	32,710
5									6								
7	STADIUM LIGHTING #4 VISITOR SIDE NORTH	50/3	29,700						8								
9									10	3-POLE SPACE							
11									12								
13	STADIUM LIGHTING #1 HOME SIDE NORTH	50/3	29,700						14								
15									16	3-POLE SPACE							
17									18								
19									20								
21	PANEL L	45/3	332	3,600	0	0	0	0	0	22	TRANSFORMER "TXD" CONCESSION HOME	125/3	2,812	16,199	7,500	0	0	0	0
23									24								
25									26								
27	TRANSFORMER "TXB" CONCESSION VISITOR	70/3	2,464	22,287	7,500	0	0	10,400	0	28	TRANSFORMER "TXSB"/ PANEL "SB"	45/3	656	7,740	4,060	0	0	0	0
29									30								
31									32	STADIUM LIGHTING #3 VISITOR SIDE SOUTH	50/3	29,700						
33	STADIUM LIGHTING #2 HOME SIDE SOUTH	50/3	29,700						34								
35									36								
	SUBTOTAL		91,896	25,887	7,500	0	0	10,400	0	SUBTOTAL		35,403	53,756	46,560	0	0	13,870	32,710
										TOTAL LOAD		127,299	79,643	54,060	0	0	24,270	32,710
												W=> DIV	44,822	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 317,982
DEMAND LOAD (VA) 258,891
AMPACITY DEMAND 311.4 A

* - INDICATES NEW CIRCUIT BREAKER FOR EXISTING PANEL

PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: BREAKER | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 225 AMPS

PANEL: D | SPECIAL FEATURES: WESTINGHOUSE PANELBOARD

CKT	LOAD	C/B	LIGHTING EQPM.	MISC 1Ø EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING EQPM.	MISC 1Ø EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	LIGHTING	20/1	400						2	ICE BOX	20/1						
3	SPARE	20/1							4	RECEPTACLE	20/1		200				
5	LIGHTING EXTERIOR/BLEACHER	20/1	1,302						6	RECEPTACLE	20/1		200				
7	RECEPTACLE	20/1		200					8	RECEPTACLE	20/1		200				
9	RECEPTACLE	20/1		200					10	RECEPTACLE	20/1		200				
11	RECEPTACLE	20/1		200					12	RECEPTACLES	20/1		400				
13	RECEPTACLE	20/1		200					14	RECEPTACLE	20/1		200				
15	RECEPTACLE	20/1		200					16	RECEPTACLE	20/1		200				
17	SPARE	20/1							18	RECEPTACLE	20/1		200				
19	SPARE	20/1							20	RECEPTACLE	20/1		200				
21	RECEPTACLE	20/1		200					22	RECEPTACLE	20/1		200				
23	RECEPTACLE	20/1		200					24								
25	RECEPTACLE	20/1		200					26	SPARE	30/3						
27	WATER HEATER	30/2			4,500				28								
29									30	BLEACHER RECEPTACLE	20/1		200				
31	BLEACHER RECEPTACLE	20/1		200					32	BLEACHER RECEPTACLE	20/1		200				
33	BLEACHER RECEPTACLE	20/1		200					34	BLEACHER RECEPTACLE	20/1		200				
35	SPACE								36	BLEACHER RECEPTACLE	20/1		200				
37	SPACE								38								
39	SPARE	30/2							40	PANEL E	100/3	1,110	11,199	3,000	0	0	0	0
41									42								
43	SPACE								44	SPACE							
45	SPACE								46	SPACE							
47	SPACE								48	SPACE							
	SUBTOTAL		1,702	2,000	4,500	0	0	0	0	SUBTOTAL		1,110	14,199	3,000	0	0	0	0
										TOTAL LOAD		2,812	16,199	7,500	0	0	0	0
												W=> DIV	13,100	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 26,511
DEMAND LOAD (VA) 23,412
AMPACITY DEMAND 65.0 A

PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: LUGS | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 100 AMPS

PANEL: E | SPECIAL FEATURES: WESTINGHOUSE PANELBOARD

CKT	LOAD	C/B	LIGHTING EQPM.	MISC 1Ø EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING EQPM.	MISC 1Ø EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	SPARE	20/1							2	SPARE	20/1						
3	SPARE	20/1							4	SPARE	20/1						
5	SPARE	20/1							6	SPARE	20/1						
7	SPARE	20/1							8	SPARE	20/1						
9	SPARE	20/1							10	SPARE	20/1						
11	SPARE	20/1							12	SPARE	20/1						
13	SPARE	20/1							14	SPARE	20/1						
15	SPARE	20/1							16	SPARE	20/1						
17	SPARE	20/1							18	SPARE	20/1						
19	PANEL "LHN"	50/3*	486	5,284	0	0	0	0	20	PANEL "LHS"	50/3*	624	5,915	3,000	0	0	0	0
21									22								
23									24								
	SUBTOTAL		486	5,284	0	0	0	0	0	SUBTOTAL		624	5,915	3,000	0	0	0	0
										TOTAL LOAD		1,110	11,199	3,000	0	0	0	0
												W=> DIV	10,600	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 15,309
DEMAND LOAD (VA) 14,710
AMPACITY DEMAND 40.8 A

* - INDICATES NEW CIRCUIT BREAKER FOR EXISTING PANEL

PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: BREAKER | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 50 AMPS

PANEL: LHN | SPECIAL FEATURES: SQUARE D QO LOAD CENTER BACK-FED MAIN

CKT	LOAD	C/B	LIGHTING EQPM.	MISC 1Ø EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING EQPM.	MISC 1Ø EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	LIGHTING	20/1	486						2	HAND DRYER	20/1		910				
3	RECEPTACLES	20/1		600					4	HAND DRYER	20/1		910				
5	HAND DRYER	20/1		910					6	HAND DRYER	20/1		910				
7	EF-NW-1	20/1		90					8	HAND DRYER	20/1		910				
9	EF-NW-2	20/1		44					10	SPARE	20/1						
11	SPARE	20/1							12	SPARE	20/1						
13	SPARE	20/1							14	SPARE	20/1						
15	SPACE								16	SPARE							
17	SPACE								18	SPACE							
19	BACK-FED MAIN	50/3							20	SPACE							
21									22	SPACE							
23									24	SPACE							
	SUBTOTAL		486	1,644	0	0	0	0	0	SUBTOTAL		0	3,640	0	0	0	0	0
										TOTAL LOAD		486	5,284	0	0	0	0	0
												W=> DIV	5,284	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 5,770
DEMAND LOAD (VA) 5,770
AMPACITY DEMAND 16.0 A

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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DATE ISSUED:
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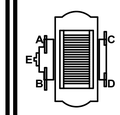
KEY PLAN (NTS)



PLAN NORTH | TRUE NORTH

SHEET NAME
ELECTRICAL PANELBOARD SCHEDULES

SHEET NUMBER
E5.2

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PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: BREAKER | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 50 AMPS

PANEL: LHS | SPECIAL FEATURES: SQUARE D QO LOAD CENTER BACK-FED MAIN

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	LIGHTING / EF-SW-4 / EF-SW-1	20/1	624	22						2	HAND DRYER	20/1		910					
3	RECEPTACLES	20/1		1,200						4	HAND DRYER	20/1		910					
5	HAND DRYER	20/1		910						6	HAND DRYER	20/1		910					
7	HAND DRYER	20/1		910						8	EF-SW-2	20/1		90					
9	EF-SW-3	20/1		53						10	SPARE	20/1							
11	SPARE	20/1								12	SPARE	20/1							
13	SPARE	20/1								14	SPARE	20/1							
15	SPARE	20/1								16	SPARE	20/1							
17	SPACE									18	SPACE								
19	BACK-FED MAIN	50/3								20	SPACE								
21										22	EWH-1	20/2			3,000				
23										24									
	SUBTOTAL		624	3,095	0	0	0	0	0		SUBTOTAL		0	2,820	3,000	0	0	0	0
											TOTAL LOAD		624	5,915	3,000	0	0	0	0
													W=> DIV	5,915	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 9,539
DEMAND LOAD (VA) 9,539
AMPACITY DEMAND 26.5 A

PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: LUGS | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 125 AMPS

PANEL: L | SPECIAL FEATURES:

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	RECEPTACLES	20/1		400						2	RECEPTACLES	20/1		400					
3	RECEPTACLES	20/1		400						4	RECEPTACLES	20/1		400					
5	RECEPTACLES	20/1		400						6	RECEPTACLES	20/1		400					
7	RECEPTACLES	20/1		400						8	RECEPTACLES	20/1		400					
9	LIGHTING	20/1	296							10	LIGHTING	20/1							
11	EXTERIOR LIGHTING	20/1	36							12	RECEPTACLES ENTRANCE	20/1*		400					
13	SPACE									14	SPACE								
15	SPACE									16	SPACE								
17	SPACE									18	SPACE								
19	SPACE									20	SPACE								
21	SPACE									22	SPACE								
23	SPACE									24	SPACE								
	SUBTOTAL		332	1,600	0	0	0	0	0		SUBTOTAL		0	2,000	0	0	0	0	0
											TOTAL LOAD		332	3,600	0	0	0	0	0
													W=> DIV	3,600	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 3,932
DEMAND LOAD (VA) 3,932
AMPACITY DEMAND 10.9 A

* - INDICATES NEW CIRCUIT BREAKER FOR EXISTING PANEL

PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: BREAKER | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 150 AMPS

PANEL: B | SPECIAL FEATURES: WESTINGHOUSE

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	SPARE	20/1								2	SPARE	20/1							
3	PANEL "LVN"	50/3*	345	5,139	0	0	0	0	0	4	PANEL "LVS"	50/3*	335	5,548	3,000	0	0	0	0
5										6									
7										8									
9	LIGHTING EXTERIOR/BLEACHER	20/1	1,428							10	BLEACHER RECEPTACLE	20/1		200					
11	SPARE	20/1								12	BLEACHER RECEPTACLE	20/1		200					
13	SPARE	20/1								14	RECEPTACLE	20/1		200					
15	SPARE	20/1								16	RECEPTACLE	20/1		200					
17	SPARE	20/1								18	RECEPTACLE	20/1		200					
19	RECEPTACLE	20/1		200						20	RECEPTACLE	20/1		200					
21	RECEPTACLE	20/1		200						22	RECEPTACLE	20/1		200					
23	RECEPTACLE	20/1		200						24	REFRIGERATOR	20/1		1,500					
25	RECEPTACLE	20/1		200						26	SPARE	20/1							
27	RECEPTACLE	20/1		200						28	SPARE	20/1							
29	RECEPTACLE	20/1		200						30	SPARE	20/1							
31	RECEPTACLE	20/1		200						32	SPARE	20/1							
33	RECEPTACLE	30/1		2,500						34	SPARE	20/1							
35	RECEPTACLE	20/1		200						36	ICE MACHINE	20/1		1,500					
37	PANEL B2	100/3	89	3,100	0	0	0	10,400	0	38	INTERIOR LIGHTING CONCESSION	20/1	267						
39										40	WATER HEATER	30/2			4,500				
41										42									
	SUBTOTAL		1,862	12,339	0	0	0	10,400	0		SUBTOTAL		602	9,948	7,500	0	0	0	0
											TOTAL LOAD		2,464	22,287	7,500	0	0	10,400	0
													W=> DIV	16,144	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 42,651
DEMAND LOAD (VA) 36,508
AMPACITY DEMAND 101.3 A

* - INDICATES NEW CIRCUIT BREAKER FOR EXISTING PANEL

PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: LUGS | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 100 AMPS

PANEL: B2 | SPECIAL FEATURES: EATON POW-R-LINE PRL1a

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	LIGHTING	20/1	89							2	AH #2	20/2						4,160	
3	SPARE	20/1								4									
5	SPARE	20/1								6	AH #1	30/3						6,240	
7	ICE MACHINE	20/1		1,500						8									
9	RECEPTACLES	20/1		600						10									
11	RECEPTACLES	20/1		800						12	SPARE	20/1							
13	EXTERIOR RECEPTACLE	20/1		200						14	SPARE	20/1							
15	SPARE	20/1								16	SPARE	20/1							
17	SPARE	20/1								18	SPARE	20/1							
	SUBTOTAL		89	3,100	0	0	0	0	0		SUBTOTAL		0	0	0	0	0	10,400	0
											TOTAL LOAD		89	3,100	0	0	0	10,400	0
													W=> DIV	3,100	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 13,589
DEMAND LOAD (VA) 13,589
AMPACITY DEMAND 37.7 A

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STATE OF TEXAS — SCOTT E. STRIDDE — 84831 — LICENSED PROFESSIONAL ENGINEER

11/11/2025

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Registration # F-006328

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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DATE ISSUED:
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PROJECT NUMBER:
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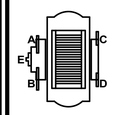
KEY PLAN (NTS)



PLAN NORTH | TRUE NORTH

SHEET NAME
ELECTRICAL PANELBOARD SCHEDULES

SHEET NUMBER
E5.3

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PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: BREAKER | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 50 AMPS

PANEL: LVN | SPECIAL FEATURES: SQUARE D QO LOAD CENTER BACK-FED MAIN

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	LIGHTING / EF-NE-3	20/1	345	11						2	HAND DRYER	20/1		910					
3	RECEPTACLES	20/1		1,000						4	HAND DRYER	20/1		910					
5	HAND DRYER	20/1		910						6	HAND DRYER	20/1		910					
7	EF-NE-2	20/1		44						8	EF-NE-1	20/1		44					
9	SPARE	20/1								10	BLEACHER RECEPTACLE	20/1		200					
11	SPARE	20/1								12	BLEACHER RECEPTACLE	20/1		200					
13	SPARE	20/1								14	SPARE	20/1							
15	SPACE									16	SPARE	20/1							
17	SPACE									18	SPACE	20/1							
19	BACK-FED MAIN	50/3								20	SPACE								
21										22	SPACE								
23										24	SPACE								
	SUBTOTAL		345	1,965	0	0	0	0	0		SUBTOTAL		0	3,174	0	0	0	0	0
											TOTAL LOAD		345	5,139	0	0	0	0	0
														W=> DIV	5,139	W=> DIV	0	0	

TOTAL CONNECTED LOAD (VA): 5,484
DEMAND LOAD (VA): 5,484
AMPACITY DEMAND: 15.2 A

PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: BREAKER | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 50 AMPS

PANEL: LVS | SPECIAL FEATURES: SQUARE D QO LOAD CENTER BACK-FED MAIN

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	LIGHTING / EF-SE-3	20/1	335	11						2	HAND DRYER	20/1		910					
3	RECEPTACLES	20/1		1,000						4	HAND DRYER	20/1		910					
5	HAND DRYER	20/1		910						6	HAND DRYER	20/1		910					
7	EF-SE-1	20/1		53						8	RECEPTACLES ENTRANCE CANOPY	20/1		400					
9	EF-SE-2	20/1		44						10	SPARE	20/1							
11	BLEACHER RECEPTACLE	20/1		200						12	SPARE	20/1							
13	BLEACHER RECEPTACLE	20/1		200						14	SPARE	20/1							
15	SPARE	20/1								16	SPARE	20/1							
17	SPARE	20/1								18	SPACE								
19	BACK-FED MAIN	50/3								20	SPACE								
21										22	EWH-1	20/2			3,000				
23										24									
	SUBTOTAL		335	2,418	0	0	0	0	0		SUBTOTAL		0	3,130	3,000	0	0	0	0
											TOTAL LOAD		335	5,548	3,000	0	0	0	0
														W=> DIV	5,548	W=> DIV	0	0	

TOTAL CONNECTED LOAD (VA): 8,883
DEMAND LOAD (VA): 8,883
AMPACITY DEMAND: 24.7 A

PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: LUGS | VOLTAGE: 277/480 | THREE PHASE | CAPACITY: 250 AMPS

PANEL: HPB | SPECIAL FEATURES: SQUARE D NF

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	ELEVATOR	70/3 S.T.			35,000					2	SPD	60/3							
3										4									
5										6									
7	SHUNT TRIP									8									
9										10	TRANSFORMER TXLPB / PANEL LPB	110/3	2,235	29,817	0	0	0	13,870	32,710
11										12									
13										14									
15										16									
17										18									
19										20									
21										22									
23										24									
	SUBTOTAL		0	0	35,000	0	0	0	0		SUBTOTAL		2,235	29,817	0	0	0	13,870	32,710
											TOTAL LOAD		2,235	29,817	35,000	0	0	13,870	32,710
														W=> DIV	19,909	W=> DIV	0	0	

TOTAL CONNECTED LOAD (VA): 113,632
DEMAND LOAD (VA): 89,854
AMPACITY DEMAND: 108.1 A

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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DATE ISSUED:
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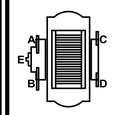
KEY PLAN (NTS)



PLAN NORTH | TRUE NORTH

SHEET NAME
ELECTRICAL PANELBOARD SCHEDULES

SHEET NUMBER
E5.4

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PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: BREAKER | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 250 AMP

PANEL: LPB | SPECIAL FEATURES: SQUARE D NQ

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	GROUND FLOOR LIGHTING	20/1	200							2	EXTERIOR LIGHTING PRESSBOX	20/1	263						
3	RECEPTACLES	20/1		600						4	INTERIOR LIGHTING PRESSBOX/CF-1	20/1	672	17					
5	RECEPTACLES	20/1		1,000						6	BACKLIT SIGNAGE	20/1	1,000						
7	SUMP PUMP SIGNALING DEVICE	20/1		200						8	RECEPTACLES	20/1		1,000					
9	FACP	20/1		500						10	RECEPTACLES	20/1		800					
11	IT RACK	20/1		1,500						12	RECEPTACLES	20/1		800					
13	IT RACK	20/1		1,500						14	RECEPTACLES	20/1		800					
15	IT RACK UPS	30/2		4,500						16	RECEPTACLES	20/1		800					
17										18	RECEPTACLES	20/1		600					
19	RECEPTACLES	20/1		600						20	RECEPTACLES	20/1		800					
21	RECEPTACLES	20/1		800						22	RECEPTACLES	20/1		600					
23	RECEPTACLES	20/1		800						24	RECEPTACLES	20/1		800					
25	RECEPTACLES	20/1		600						26	RECEPTACLES	20/1		400					
27	RECEPTACLES	20/1		800						28	RECEPTACLES	20/1		800					
29	RECEPTACLES	20/1		800						30	PTAC-5	20/2						1,085	2,780
31	RECEPTACLES	20/1		800						32									
33	RECEPTACLES	20/1		800						34	PTAC-4	20/2						1,085	2,780
35	RECEPTACLES	20/1		800						36									
37	PTAC-2	15/2						770	1,640	38	PTAC-3	30/2						1,395	4,090
39										40									
41	PTAC-1	15/2						1,395	1,640	42	PTAC-8	30/2						1,395	4,090
43										44									
45	PTAC-6	20/2						1,085	2,780	46	AHU-E-1	60/2						1,130	10,130
47										48									
49	PTAC-7	20/2						1,340	2,780	50	ACCU-E-1	30/2						3,190	
51										52									
53	RECEPTACLE	20/1		200						54	VIDEO RACK	20/1		1,500					
55	RECEPTACLE	20/1		200						56	VIDEO RACK	20/1		1,500					
57	ELEVATOR LIGHTS	20/1	100							58	RECEPTACLES	20/1		200					
59	RECEPTACLES	20/1		200						60	RECEPTACLES	20/1		200					
61	RECEPTACLES	20/1		200						62	RECEPTACLES	20/1		200					
63	RECEPTACLES	20/1		200						64	RECEPTACLES	20/1		200					
65	RECEPTACLES	20/1		200						66	SPARE	20/1							
67	SPARE	20/1								68	SPARE	20/1							
69	SPARE	20/1								70	SPARE	20/1							
71	SPARE	20/1								72	SPARE	20/1							
73	SPACE									74	SPACE								
75	SPACE									76	SPACE								
77	SPACE									78	SPACE								
79	SPACE									80	SPACE								
81	SPACE									82	SPACE								
83	SPACE									84	SPACE								
	SUBTOTAL		300	17,800	0	0	0	4,590	8,840		SUBTOTAL		1,935	12,017	0	0	0	9,280	23,870
											TOTAL LOAD		2,235	29,817	0	0	0	13,870	32,710
														W=> DIV	19,909	W=> DIV	0	0	

TOTAL CONNECTED LOAD (VA) 78,632
DEMAND LOAD (VA) 54,854
AMPACITY DEMAND 152.3 A

PANELBOARD SCHEDULE

JOB: 25203-C... | CABINET: SURFACE | MAINS: BREAKER | VOLTA... 120/208 | THREE PHASE | CAPACI... 100 AMPS

PANEL: SB | SPECIAL... WESTING HOUSE

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	RECEPTACLES	20/1		1,600						2									
3	PUMP - SPRINKLER	30/2			4,060					4	MAIN BREAKER	100/3							
5										6									
7	LIGHTING	20/1	560							8	RECEPTACLE	50/2		200					
9	SPRINKLER CONTR...	30/1		2,340						10									
11	ICE MACHINE	20/1		1,500						12	RECEPTACLE	50/2		200					
13	RECEPTACLE	20/1		200						14									
15	RECEPTACLE	20/1		200						16	GOLF CART	20/1		1,500					
17	SPARE	30/1								18	EXTERIOR LIGHTING	20/1	96						
	SUBTOTAL		560	5,840	4,060	0	0	0	0		SUBTOTAL		96	1,900	0	0	0	0	0
											TOTAL LOAD		656	7,740	4,060	0	0	0	0
													W=> DIV	7,740	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 12,456
DEMAND LOAD (VA) 12,456
AMPACITY DEMAND 34.6 A

PANELBOARD SCHEDULE

JOB: 25203-CISD STADIUM | CABINET: SURFACE | MAINS: LUGS | VOLTAGE: 120/208 | THREE PHASE | CAPACITY: 125 AMPS

PANEL: LSB | SPECIAL FEATURES: SQUARE D QO LOAD CENTER

CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING	CKT	LOAD	C/B	LIGHTING	MISC 1Ø	MISC. EQPM.	KITCHEN EQPM.	WELDING EQPM.	A/C COOLING	A/C HEATING
1	RECEPTACLE	20/1		200						2	RECEPTACLE	20/1		200					
3	RECEPTACLE	20/1		200						4	RECEPTACLE	20/1		200					
5	RECEPTACLE	20/1		200						6	25-SECOND PLAY CLOCK	20/1		1,000					
7	RECEPTACLE	20/1		200						8	SPARE	20/1							
9	SPARE	20/1								10	SPARE	20/1							
11	SPARE	20/1								12	SPARE	20/1							
	SUBTOTAL		0	800	0	0	0	0	0		SUBTOTAL		0	1,400	0	0	0	0	0
											TOTAL LOAD		0	2,200	0	0	0	0	0
													W=> DIV	2,200	W=> DIV	0	0		

TOTAL CONNECTED LOAD (VA) 2,200
DEMAND LOAD (VA) 2,200
AMPACITY DEMAND 6.1 A

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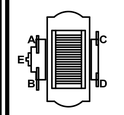

PLAN NORTH | TRUE NORTH

SHEET NAME
ELECTRICAL PANELBOARD SCHEDULES

SHEET NUMBER
E5.5

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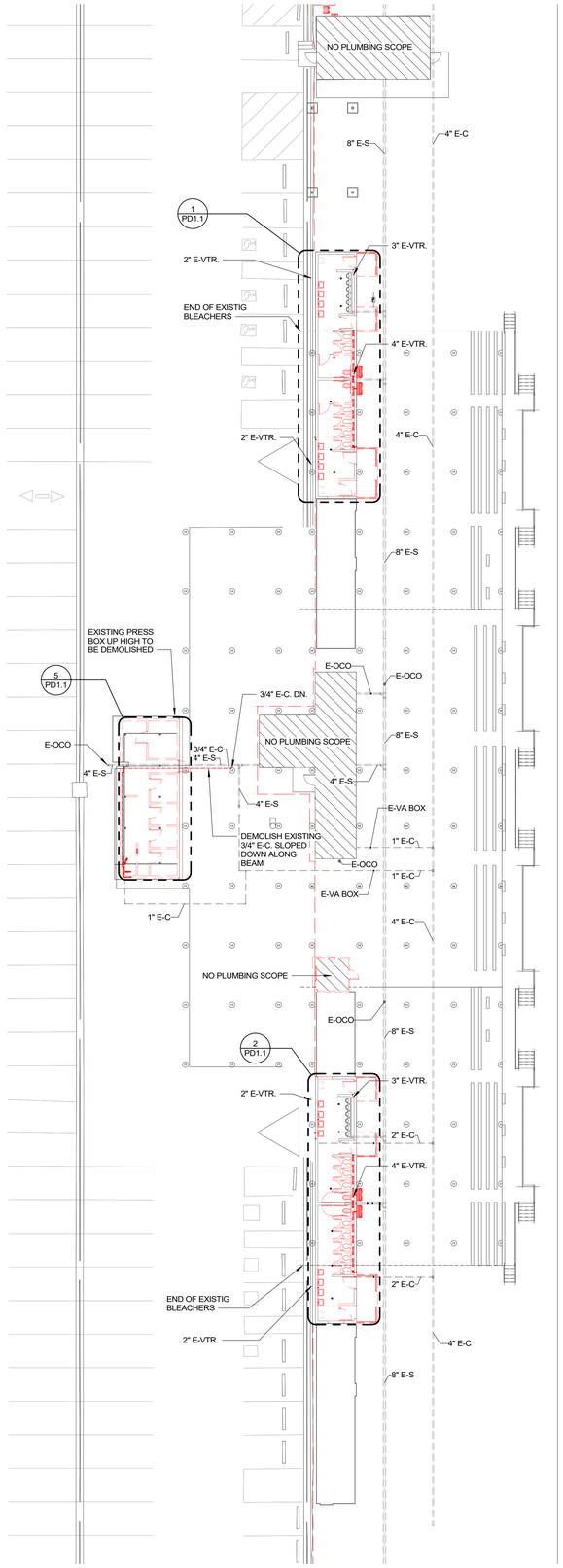
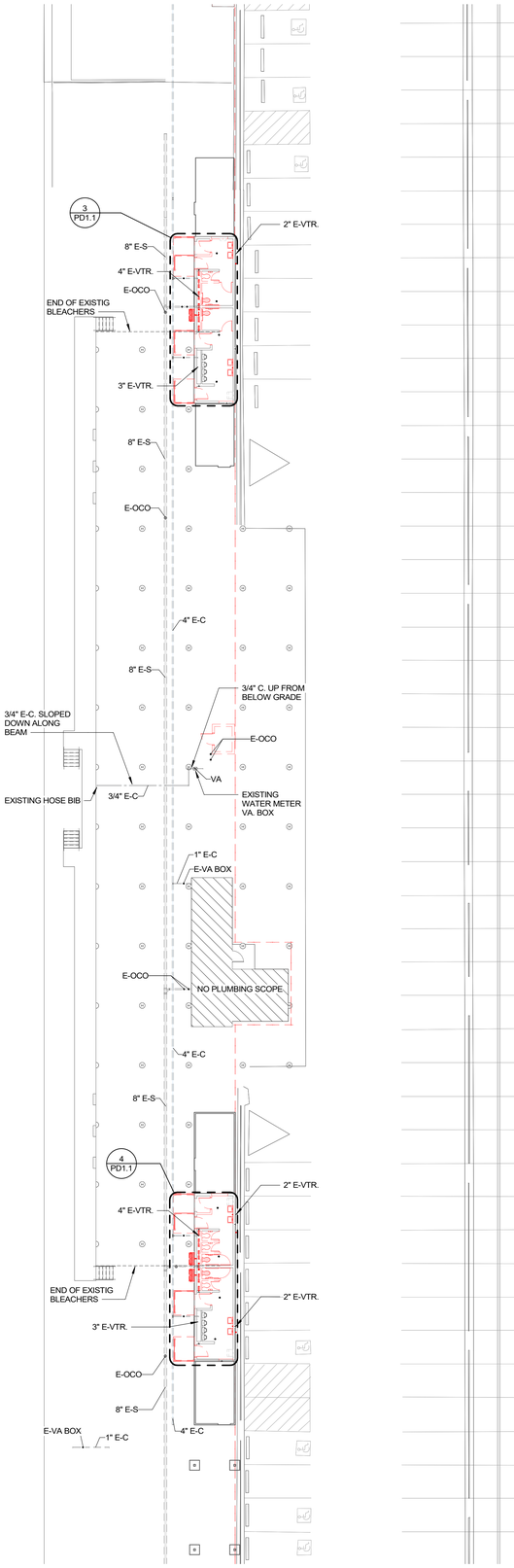


PLUMBING DEMOLITION GENERAL NOTES

1. CONTRACTOR SHALL REMOVE FROM THE PROJECT ALL DEMOLISHED MATERIALS NOT INDICATED AS SALVAGED MATERIAL FOR RE-USE.
2. AREAS WHERE DEMOLITION WORK EXISTS SHALL BE MARKED OFF AND INDICATED AS HAZARDOUS AREAS.
3. COORDINATE DEMOLITION ACTIVITIES WITH OTHER TRADES TO AVOID DISRUPTION, DELAY, OR DUPLICATION OF WORK.
4. CONTRACTOR SHALL IMMEDIATELY NOTIFY ARCHITECT IF DEMOLITION WORK ON ITEMS IS SUSPECTED TO INVOLVE ASBESTOS OR LEAD BASED PAINT NOT INDICATED AS A SCOPE OF WORK ITEM.
5. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS, FEES, AND INSPECTIONS REQUIRED BY GOVERNING AUTHORITIES.
6. CONTRACTOR AND/OR REQUIRED CONTRACTOR PERSONNEL SHALL ACQUIRE AND MAINTAIN, THROUGH THE PROJECT, ALL REQUIRED LICENSES AND/OR CERTIFICATIONS REQUIRED BY GOVERNING AUTHORITIES TO PERFORM. WORK AS REQUIRED BY THIS CONTRACT. LOSS OF REQUIRED LICENSES AND/OR CERTIFICATIONS SHALL NOT RELIEVE CONTRACTOR OF RESPONSIBILITIES.
7. FIELD VERIFY EXACT DIMENSIONS AND LOCATIONS OF WALL, DOORS, AND OTHER ARCHITECTURAL AND BUILDING STRUCTURES FROM ACTUAL MEASUREMENTS. ADJUST PIPE ROUTING AND ROUGH-IN LOCATIONS AS REQUIRED TO COORDINATE AND AT NO ADDITIONAL COST TO OWNER.
8. COVER ENDS OF EXPOSED PIPE AND EQUIPMENT WITH SHEET PLASTIC AND SECURE TO AVOID CONTAMINATION ENTERING SYSTEM.
9. ALL PIPING AND/OR FIXTURES SHOWN SHALL BE REMOVED.
10. LOCATIONS AND SIZES OF EXISTING SOIL, WASTE, VENT, AND WATER PIPING ARE UNCLAR. CONRACTOR MUST JOBSITE VERIFY EXACT LOCATION. AND SIZE OF PIPING. CONTRACTOR SHALL MAKE NECESSARY ADJUSTMENTS TO PROVIDE SERVICES AND CONNECTIONS AS REQUIRED.
11. IN THE EVENT THAT UTILITIES OR SUBSTRUCTURES NOT SHOWN ON THE DRAWINGS ARE ENCOUNTERED, IT SHALL BE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE ARCHITECT BEFORE PROCEEDING WITH INSTALLATION OF FIXTURES. ALL DAMAGED OR DISTURBED UTILITIES SHALL BE RECONSTRUCTED TO AS-IS OR BETTER CONDITION.
12 ALL EXISTING PIPE PENETRATIONS NOT TO BE RE-USED SHALL BE CLOSED BY GENERAL CONTRACTOR. REFER TO ARCHITECTURAL DRAWINGS AND/OR STRUCTURAL DRAWINGS FOR DETAILS.

NOTE: PERMANENTLY CAP ALL EXISTING VTR'S LOCATED BENEATH BLEACHERS.



1 PLUMBING DEMOLITION SITE PLAN
1/16" = 1'-0"

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STATE OF TEXAS
R. DAVID MORALES
108769
LICENSED PROFESSIONAL ENGINEER

11/11/2025

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342 S. Navigation Blvd.
Corpus Christi, TX 78405-3678
Registration # F-006328

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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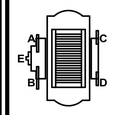
DATE ISSUED:
11/11/2025

PROJECT NUMBER:
1092-0325

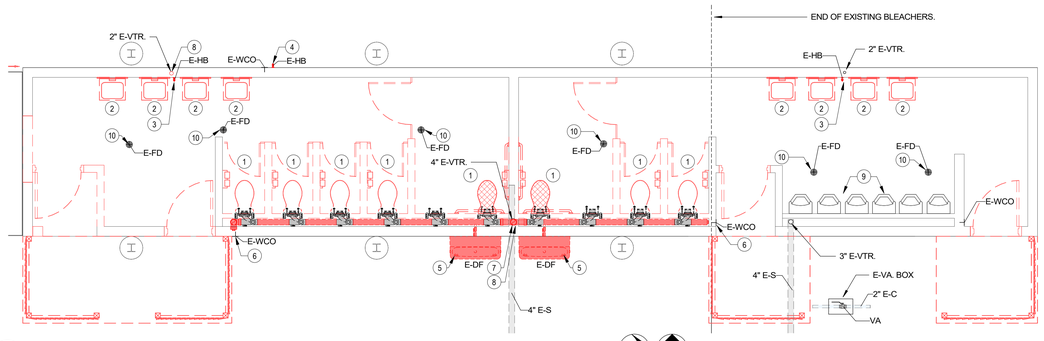
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

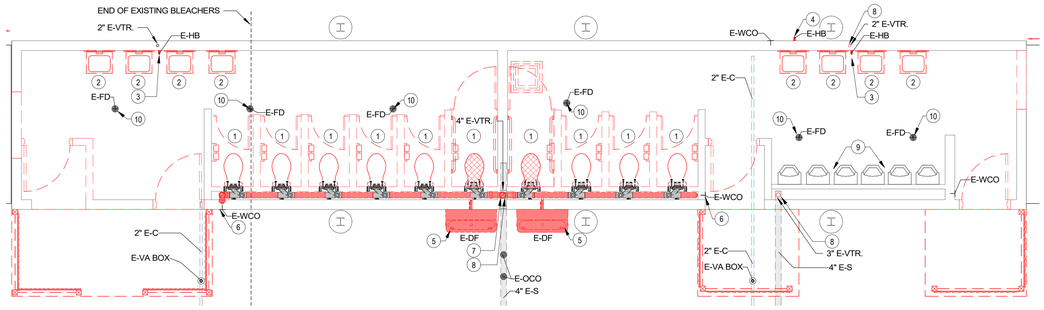
SHEET NAME
PLUMBING DEMOLITION SITE PLAN

SHEET NUMBER
PD1.0



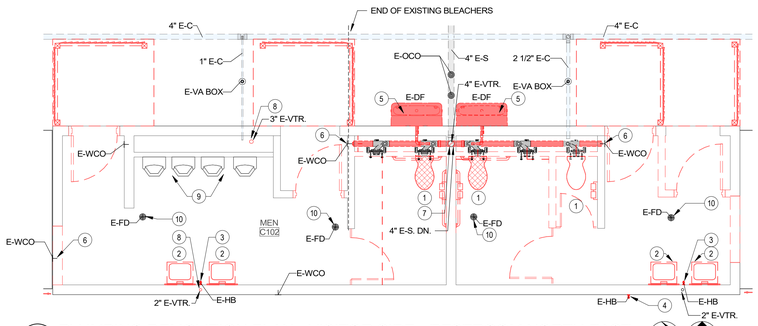
1 PLUMBING DEMOLITION PLAN - HOME SIDE - RESTROOM NORTH WEST
1/4" = 1'-0"

TRUE PLAN



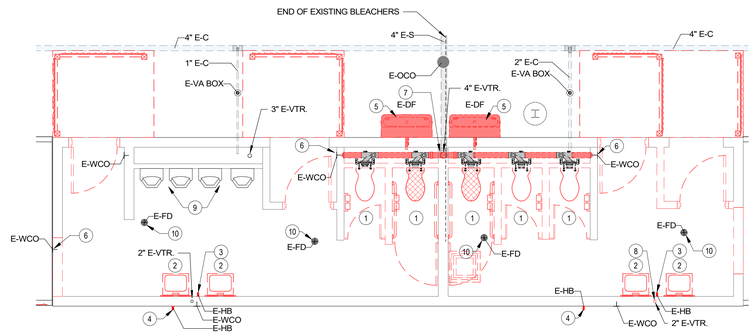
2 PLUMBING DEMOLITION PLAN - HOME SIDE - RESTROOM SOUTH WEST
1/4" = 1'-0"

TRUE PLAN



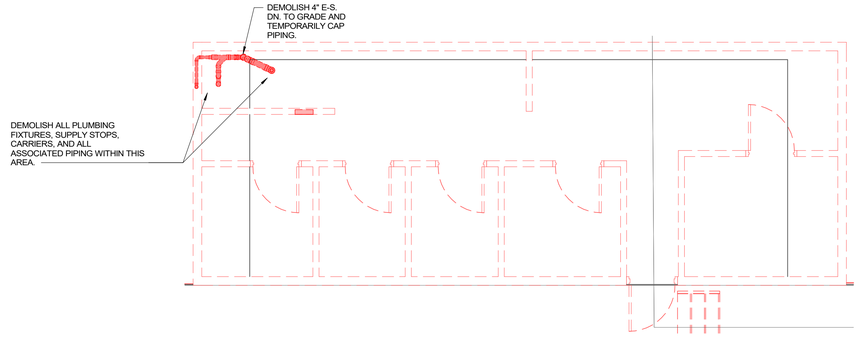
3 PLUMBING DEMOLITION PLAN - VISITOR SIDE - RESTROOM NORTH EAST
1/4" = 1'-0"

TRUE PLAN



4 PLUMBING DEMOLITION PLAN - VISITOR SIDE - RESTROOM SOUTH EAST
1/4" = 1'-0"

TRUE PLAN



5 PLUMBING DEMOLITION PLAN - PRESS BOX
1/4" = 1'-0"

TRUE PLAN

PLUMBING DEMOLITION GENERAL NOTES

1. CONTRACTOR SHALL REMOVE FROM THE PROJECT ALL DEMOLISHED MATERIALS NOT INDICATED AS SALVAGED MATERIAL FOR RE-USE.
2. AREAS WHERE DEMOLITION WORK EXISTS SHALL BE MARKED OFF AND INDICATED AS HAZARDOUS AREAS.
3. COORDINATE DEMOLITION ACTIVITIES WITH OTHER TRADES TO AVOID DISRUPTION, DELAY, OR DUPLICATION OF WORK.
4. CONTRACTOR SHALL IMMEDIATELY NOTIFY ARCHITECT IF DEMOLITION WORK ON ITEMS IS SUSPECTED TO INVOLVE ASBESTOS OR LEAD BASED PAINT NOT INDICATED AS A SCOPE OF WORK ITEM.
5. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS, FEES, AND INSPECTIONS REQUIRED BY GOVERNING AUTHORITIES.
6. CONTRACTOR AND/OR REQUIRED CONTRACTOR PERSONNEL SHALL ACQUIRE AND MAINTAIN, THROUGH THE PROJECT, ALL REQUIRED LICENSES AND/OR CERTIFICATIONS REQUIRED BY GOVERNING AUTHORITIES TO PERFORM. WORK AS REQUIRED BY THIS CONTRACT. LOSS OF REQUIRED LICENSES AND/OR CERTIFICATIONS SHALL NOT RELIEVE CONTRACTOR OF RESPONSIBILITIES.
7. FIELD VERIFY EXACT DIMENSIONS AND LOCATIONS OF WALL, DOORS, AND OTHER ARCHITECTURAL AND BUILDING STRUCTURES FROM ACTUAL MEASUREMENTS. ADJUST PIPE ROUTING AND ROUGH-IN LOCATIONS AS REQUIRED TO COORDINATE AND AT NO ADDITIONAL COST TO OWNER.
8. COVER ENDS OF EXPOSED PIPE AND EQUIPMENT WITH SHEET PLASTIC AND SECURE TO AVOID CONTAMINATION ENTERING SYSTEM.
9. ALL PIPING AND/OR FIXTURES SHOWN SHALL BE REMOVED.
10. LOCATIONS AND SIZES OF EXISTING SOIL, WASTE, VENT, AND WATER PIPING ARE UNCLAR. CONRACTOR MUST JOBSITE VERIFY EXACT LOCATION. AND SIZE OF PIPING. CONTRACTOR SHALL MAKE NECESSARY ADJUSTMENTS TO PROVIDE SERVICES AND CONNECTIONS AS REQUIRED.
11. IN THE EVENT THAT UTILITIES OR SUBSTRUCTURES NOT SHOWN ON THE DRAWINGS ARE ENCOUNTERED, IT SHALL BE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE ARCHITECT BEFORE PROCEEDING WITH INSTALLATION OF FIXTURES. ALL DAMAGED OR DISTURBED UTILITIES SHALL BE RECONSTRUCTED TO AS-IS OR BETTER CONDITION.
12. ALL EXISTING PIPE PENETRATIONS NOT TO BE RE-USED SHALL BE CLOSED BY GENERAL CONTRACTOR. REFER TO ARCHITECTURAL DRAWINGS AND/OR STRUCTURAL DRAWINGS FOR DETAILS.

PLUMBING DEMOLITION KEYED NOTES - ROUND

1 DEMOLISH EXISTING WATER CLOSET, FLUSH VALVE, TRAP PRIMER AND ASSOCIATED TRIM. TEMPORARILY CAP AND/OR PLUG WATER PIPING AND WASTE PIPING BEHIND WALL.

2 DEMOLISH EXISTING LAVATORY, FAUCET, TRAP, SUPPLY STOPS, WALL HANGERS AND ASSOCIATED TRIM. TEMPORARILY CAP AND/OR PLUG WATER PIPING AND WASTE PIPING AT WALL.

3 DEMOLISH EXISTING INTERIOR HOSE-BIB AND TEMPORARILY CAP WATER PIPING AT WALL.

4 DEMOLISH EXISTING EXTERIOR HOSE-BIB AND TEMPORARILY CAP WATER PIPING AT WALL.

5 DEMOLISH EXISTING DRINKING FOUNTAIN(S). PERMANENTLY CAP SOIL, WASTE, AND DOMESTIC WATER PIPING BEHIND WALL.

6 DEMOLISH EXISTING WALL CLEANOUT COVER.

7 DEMOLISH ALL EXISTING SANITARY PIPING AND CARRIERS WITHIN PLUMBING CHASE AND UP TO SANITARY RISER. TEMPORARILY PLUG SANITARY RISER AT APPROXIMATE LOCATION.

8 DISCONNECT AND TEMPORARILY CAP EXISTING VENT RISER BELOW ROOF PENETRATION AND ABOVE NEW CEILING LOCATION. PERMANENTLY CAP AND ABANDON EXISTING VENT ON ROOF OR DEMOLISH ACCORDING TO ARCHITECTURAL RE-ROOF REQUIREMENTS

9 EXISTING URINALS SHALL BE RE-USED. CONTRACTOR SHALL REMOVE EXISTING ERINAL AND DEMOLISH EXISTING FLUSH VALVE AND WALL FLANGE. CONTRACTOR SHALL CLEAN AND REINSTALL EXISTING URINAL. REFER TO NEW WORK FOR FLUSH VALVE AND FLANGE.

10 REMOVE EXISTING FLOOR DRAIN STRAINER. CLEAN EXISTING FLOOR DRAIN BOWL (BODY).

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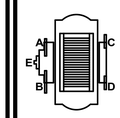

PLAN NORTH TRUE NORTH

SHEET NAME
PLUMBING DEMOLITION FLOOR PLANS

SHEET NUMBER
PD1.1

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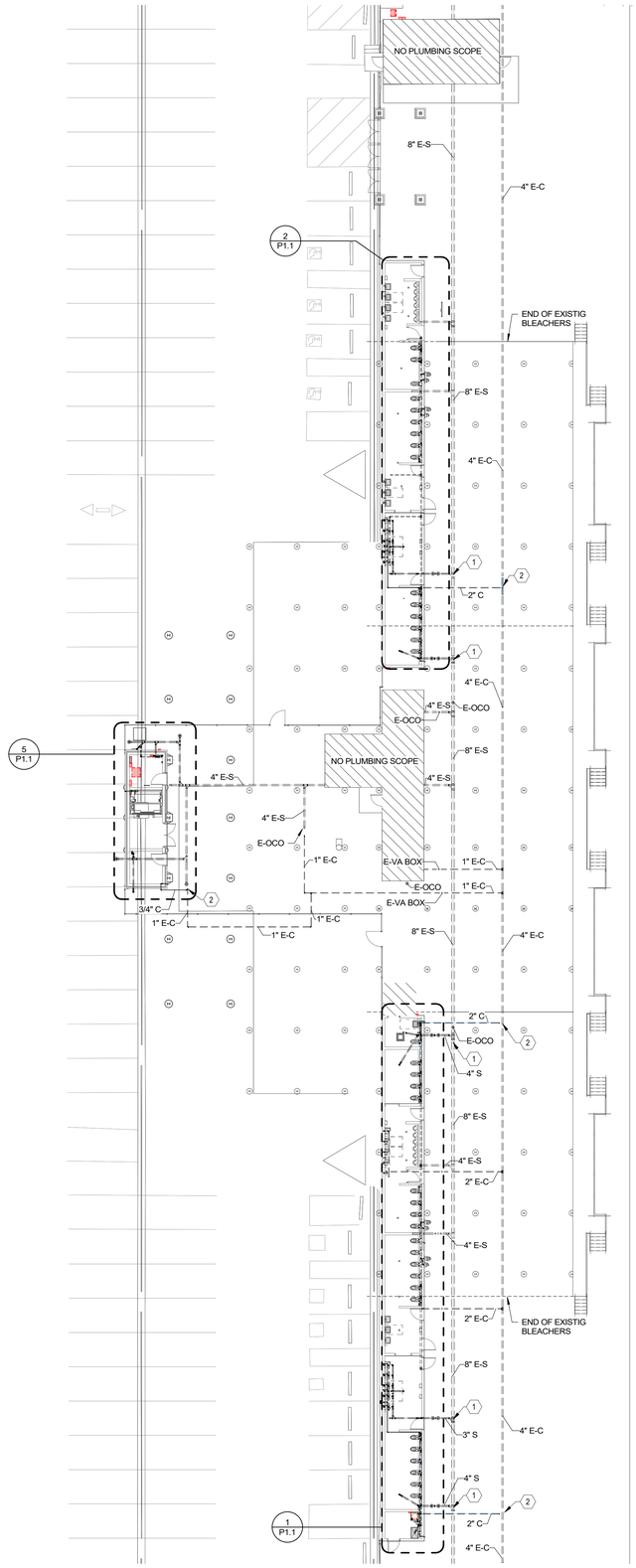


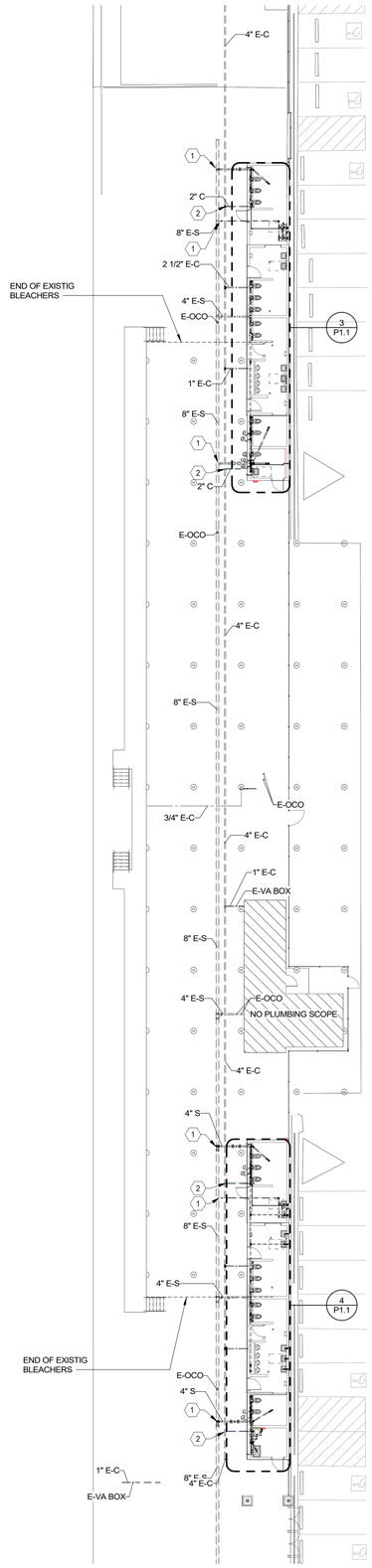
1 PLUMBING RENOVATION SITE PLAN
1/16" = 1'-0"

PLUMBING GENERAL NOTES

1. FIELD ADJUSTMENT OF PLUMBING EQUIPMENT, FIXTURE AND PIPING MAY BE NECESSARY TO FIT FIELD CONDITIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS AND OTHER TRADES. SUCH WORK SHALL BE COMPLETED AT NO COST TO THE OWNER, ARCHITECT, OR ENGINEER.
2. IN THE EVENT THAT UTILITIES OR SUBSTRUCTURES NOT SHOWN ON THE DRAWINGS ARE ENCOUNTERED, IT SHALL BE CONTRACTOR'S RESPONSIBILITY TO CONSTRUCT THE WORK AS INTENDED AT NO INCREASE IN THE CONTRACT PRICE. ALL DAMAGED OR DISTURBED UTILITIES SHALL BE RECONSTRUCTED TO AS-IS OR BETTER CONDITION BY THE CONTRACTOR AT HIS EXPENSE.
3. FIELD VERIFY EXACT DIMENSIONS AND LOCATIONS OF WALLS, DOORS, GRADE BEAMS, ETC., BEFORE BEGINNING ANY CONSTRUCTION WORK. COORDINATE WITH ARCHITECTURAL PLANS. COORDINATE WITH OTHER TRADES.
4. PROVIDE DECORATIVE TRIM AROUND OPENINGS IN FINISHED AREAS. ESCUTCHEON PLATES SHALL BE CHROME PLATED BRASS.
5. SLOPE ALL DRAIN LINES AS INDICATED. WHERE SLOPE IS NOT INDICATED, USE A SLOPE OF 0.25 INCH PER FOOT. AT NO TIME SHALL SLOPE BE LESS THAN 0.25 INCH PER FOOT UNLESS A CONFLICT EXISTS AND CONTRACTOR CAN VERIFY THAT A MEDIAN FLUID VELOCITY OF 2 FT /SEC. CAN BE ACHIEVED AND MAINTAINED OR IS DIRECTED OTHERWISE BY OWNER'S REPRESENTATIVE.
6. MAKE ALL FINAL CONNECTIONS TO FIXTURES AND EQUIPMENT INCLUDING TRAPS, WATER SERVICE, DRAINS, AND DECORATIVE TRIM. PROVIDE SHUT OFF VALVES AT ALL FIXTURES AND EQUIPMENT. PROVIDE VACUUM BREAKERS WHERE INDICATED AND AS REQUIRED BY GOVERNING AUTHORITIES AND CODE REQUIREMENTS.
7. INDICATED LOCATIONS AND SIZES OF EXISTING WATER AND SOIL/WASTE PIPING IS UNCLEAR. CONTRACTOR MUST JOBSITE VERIFY EXACT LOCATION, SIZE AND DEPTH OF PIPING. IF EXISTING PIPING IS AT LOCATION OTHER THAN THAT INDICATED, IT SHALL BE CONTRACTORS RESPONSIBILITY TO MAKE NECESSARY ADJUSTMENTS TO PROVIDE SERVICES AND CONNECTIONS REQUIRED.

PLUMBING KEYED NOTES ⬡

1 CONNECT NEW SOIL/WASTE PIPING TO EXISTING SOIL/WASTE PIPING AT APPROXIMATE LOCATION. FIELD VERIFY SIZE, DEPTH AND LOCATION OF EXISTING PIPING.
2 CONNECT NEW WATER PIPING TO EXISTING WATER PIPING AT APPROXIMATE LOCATION. FIELD VERIFY SIZE, AND LOCATION OF EXISTING PIPING.
3 MODIFY EXISTING URINAL VENT PIPING WITHIN CHASE TO CONNECT TO NEW HORIZONTAL VENT PIPING AT APPROXIMATE LOCATION.
4 INSTALL NEW WALL HUNG LAVATORY. PROVIDE NEW FIXTURE CARRIER TO BE BOLTED TO EXISTING CMU BLOCK (MAY REQUIRE BACKING). MODIFY EXISTING PIPING AS REQUIRED TO ACCOMODATE THE INSTALLATION OF THE NEW FIXTURE.
5 CONNECT EXISTING VENT PIPING RISERS FROM WATER CLOSETS TO NEW VENT PIPING ABOVE IN APPROXIMATE LOCATION.
6 EXISTING SOIL/WASTE PIPE RISER TO BE RE-USED. PIPING TO BE CUT DOWN TO BELOW GRADE AND PIPE CAP FITTING TO BE ADDED. INSTALL NEW OUTSIDE CLEANOUT TO GAIN ACCESS TO EXISTING PIPING.
7 PROVIDE NEW NICKEL BRONZE UNIVERSAL STRAINER WITH NEW STAINLESS STEEL VANDAL PROOF SCREWS.



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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

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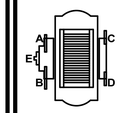
KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
PLUMBING SITE PLAN

SHEET NUMBER
P1.0

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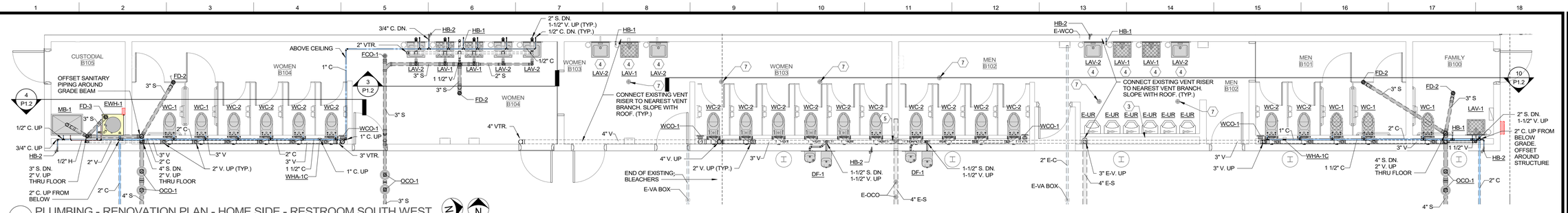
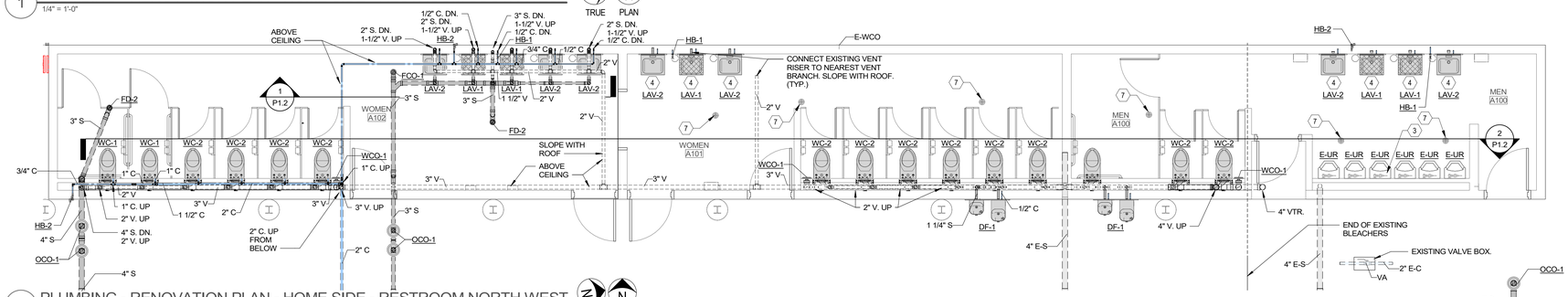
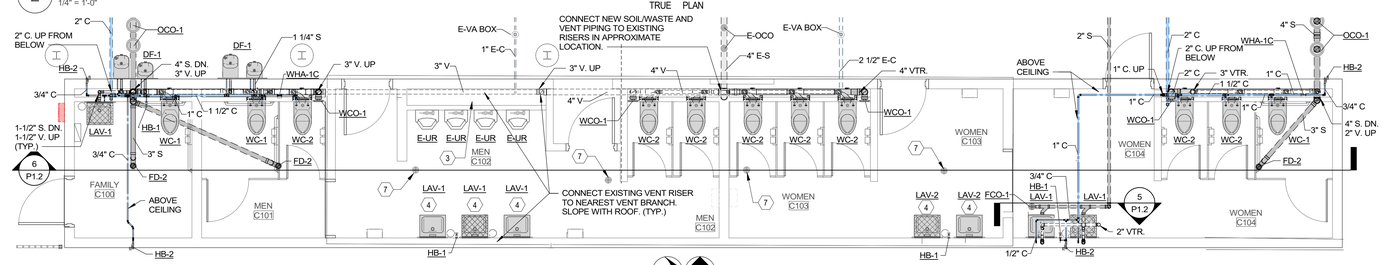


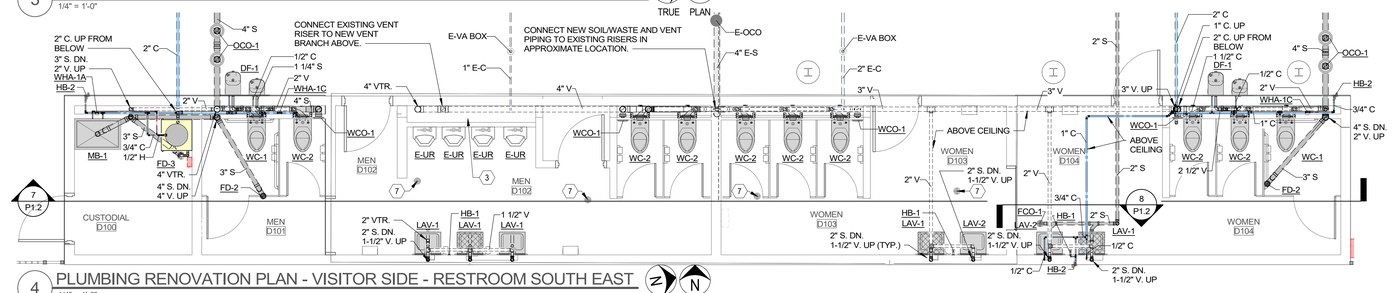
1 PLUMBING - RENOVATION PLAN - HOME SIDE - RESTROOM SOUTH WEST
1/4" = 1'-0"



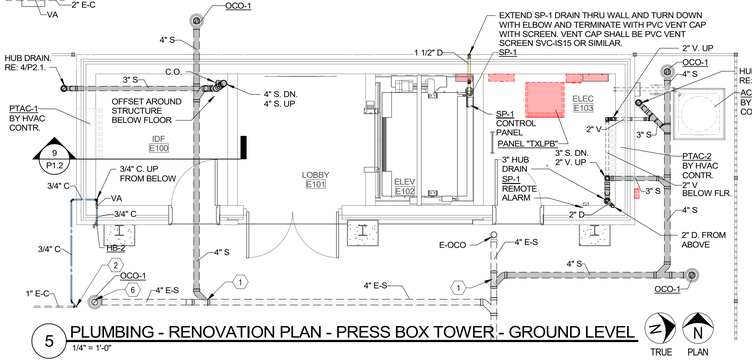
2 PLUMBING - RENOVATION PLAN - HOME SIDE - RESTROOM NORTH WEST
1/4" = 1'-0"



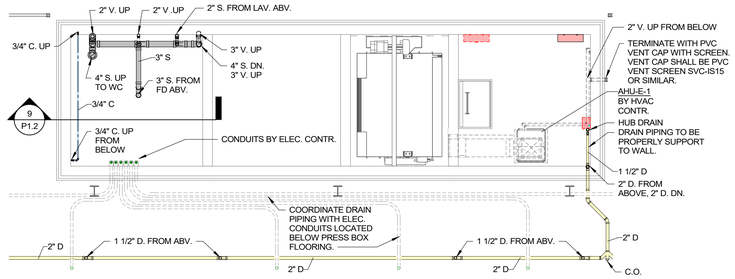
3 PLUMBING - RENOVATION PLAN - VISITOR SIDE - RESTROOM NORTH EAST
1/4" = 1'-0"



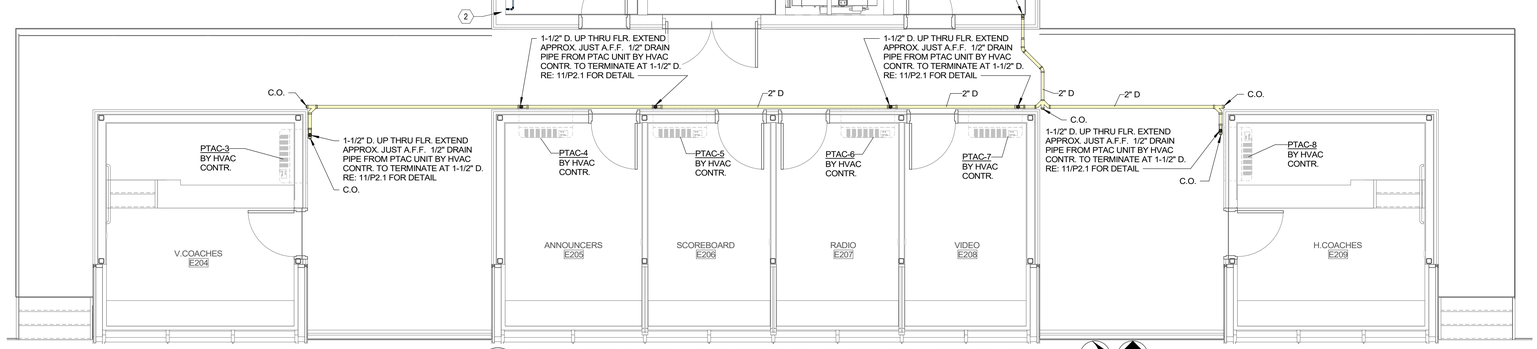
4 PLUMBING RENOVATION PLAN - VISITOR SIDE - RESTROOM SOUTH EAST
1/4" = 1'-0"



5 PLUMBING - RENOVATION PLAN - PRESS BOX TOWER - GROUND LEVEL
1/4" = 1'-0"



7 PLUMBING - RENOVATION PLAN - PRESS BOX TOWER - MEZZANINE LEVEL
1/4" = 1'-0"



6 PLUMBING - RENOVATION PLAN - PRESS BOX TOWER - UPPER LEVEL
1/4" = 1'-0"

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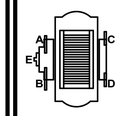

PLAN NORTH — TRUE NORTH

SHEET NAME
PLUMBING FLOOR PLANS

SHEET NUMBER
P1.1

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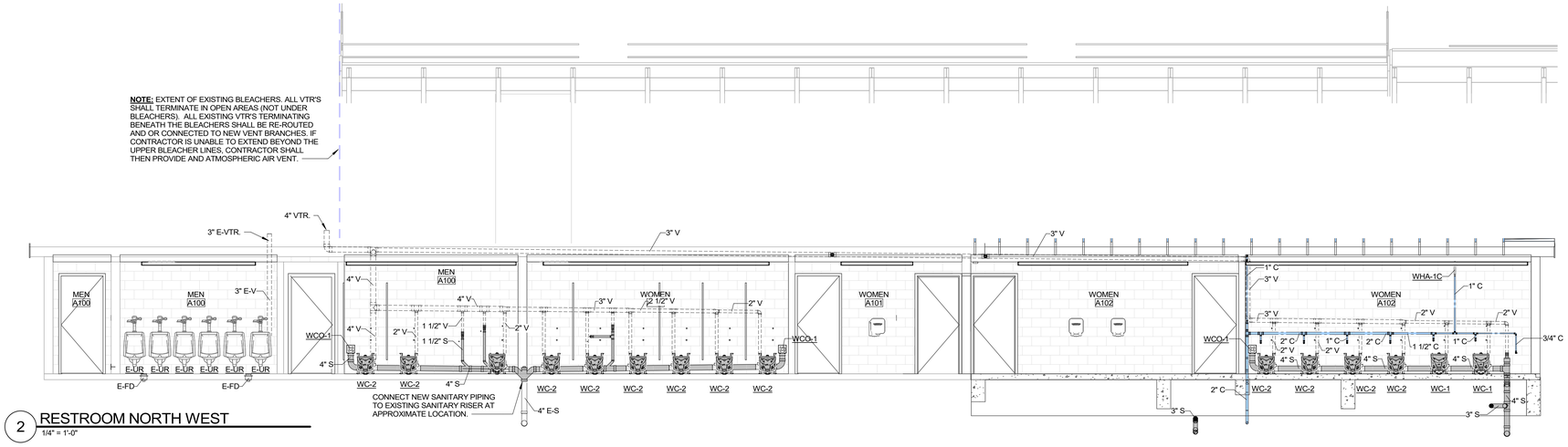
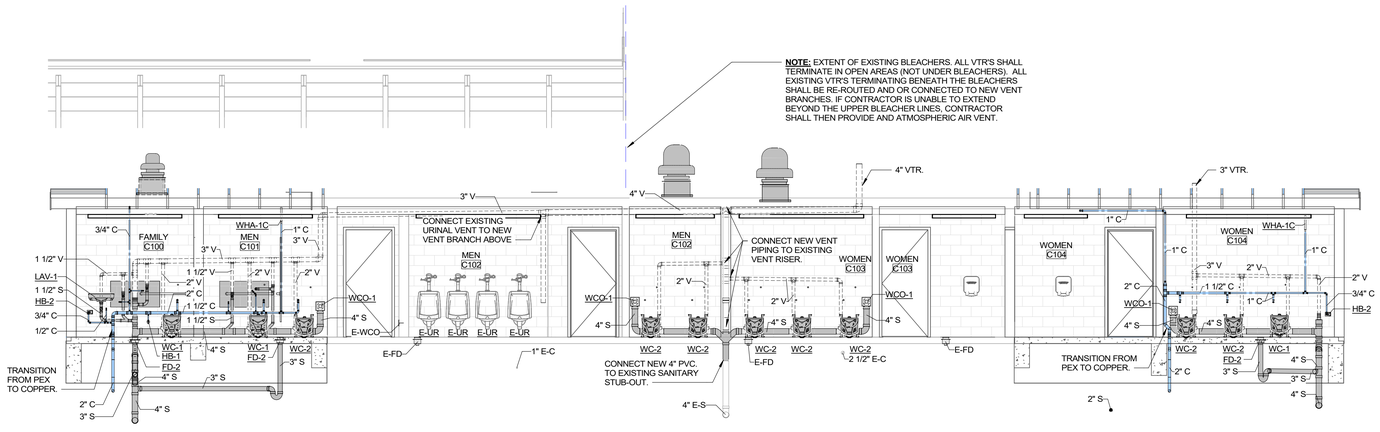
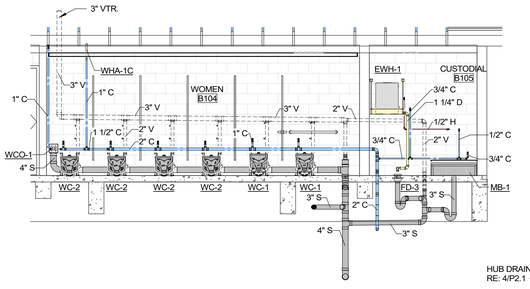


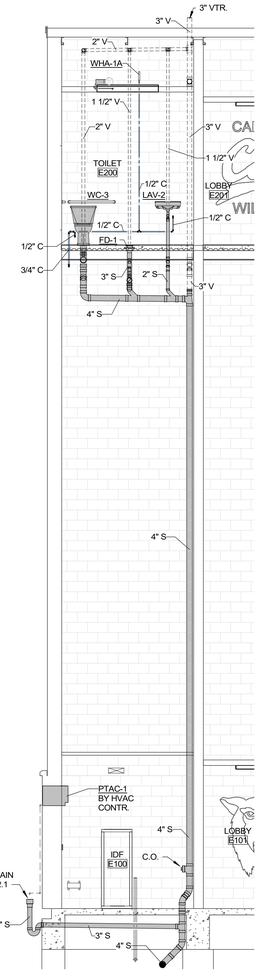
2 RESTROOM NORTH WEST
1/4" = 1'-0"



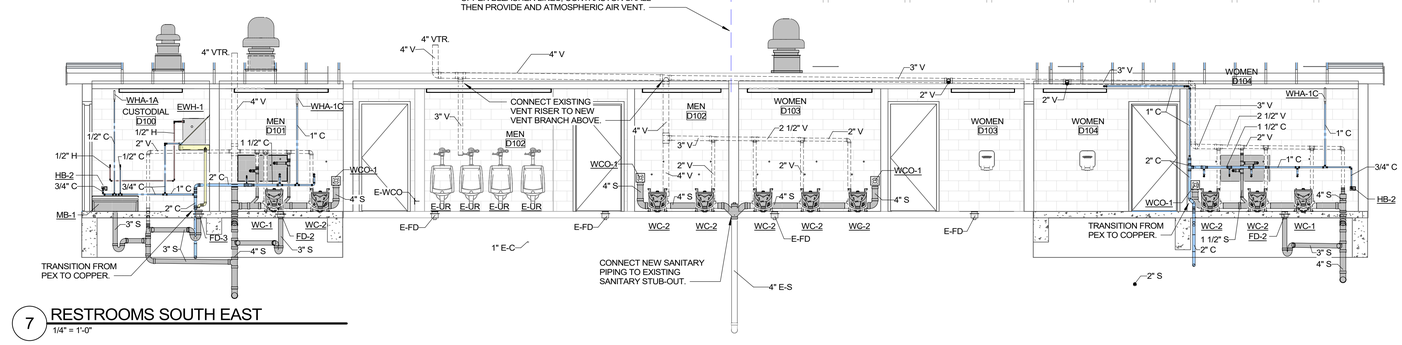
6 RESTROOMS NORTH EAST
1/4" = 1'-0"



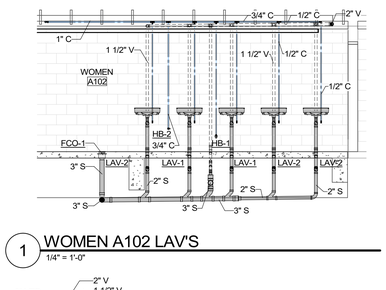
4 WOMEN R204 AND CUSTODIAL R205
1/4" = 1'-0"



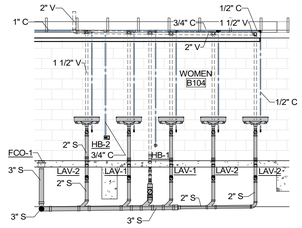
9 PRESSBOX - TOILET P200
1/4" = 1'-0"



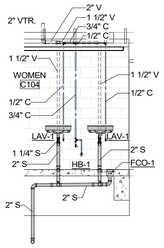
7 RESTROOMS SOUTH EAST
1/4" = 1'-0"



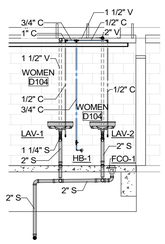
1 WOMEN A102 LAV'S
1/4" = 1'-0"



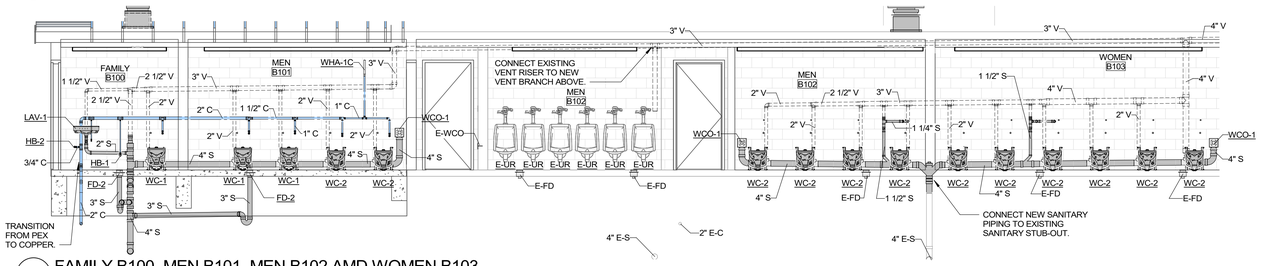
3 WOMEN B104 - LAVATORIES
1/4" = 1'-0"



5 WOMEN C104 - LAVATORIES
1/4" = 1'-0"



8 WOMEN D104 - LAVATORIES
1/4" = 1'-0"



10 FAMILY B100, MEN B101, MEN B102 AMD WOMEN B103
1/4" = 1'-0"

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Registration # F-006328

HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CAL ALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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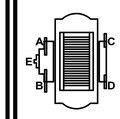
DATE ISSUED:
11/11/2025

PROJECT NUMBER:
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
PLUMBING SECTIONS

SHEET NUMBER
P1.2

11/10/2025 3:31:12 PM
C:\Users\afischer\Documents\25203-SCA-CISD STADIUM-R25_AFischer-CCr.rvt

PLUMBING ABBREVIATIONS

LAV.	LAVATORY
UR.	URINAL
MB.	MOP BASIN
WC.	WATER CLOSET
WVB.	WATER VALVE BOX
CDB.	CONDENSATE DRAIN BOX
DF.	DRINKING FOUNTAIN
EWH.	ELECTRIC WATER HEATER
FD.	FLOOR DRAIN
FCO.	FLOOR CLEANOUT
OCO.	OUTSIDE CLEANOUT
HB.	HOSE BIBB
HWCP.	HOT WATER CIRCULATING PUMP
WCO.	WALL CLEANOUT
	DOMESTIC WATER PIPING
	DOMESTIC HOT WATER PIPING
	SOIL/WASTE PIPING
	VENT PIPING
C.	COLD WATER PIPING
S.	SOIL / WASTE PIPING
V.	VENT PIPING
D.	DRAIN PIPING
TP.	TRAP PRIMER
VR.	VACUUM RELIEF VALVE
T-P VA.	TEMPERATURE-PRESSURE RELIEF VALVE
UM.	UTILITY MARKER
AC.	AIR CHAMBER
VTR.	VENT THRU ROOF
VA.	VALVE
CK. VA.	CHECK VALVE
HD.	HUB DRAIN
AP.	ACCESS PANEL
CO.	CLEANOUT
CONTR.	CONTRACTOR
DN.	DOWN

NOTES:
(1) - THIS IS A STANDARDIZED ABBREVIATION LEGEND. ALL ABBREVIATIONS HEREIN MAY NOT BE APPLICABLE TO THIS PROJECT.
(2) - PIPING SYMBOL HAVING THE LETTER "E" BEFORE THE SYMBOL DENOTES EXISTING PIPING FOR COLD WATER, HOT WATER, SOIL, WASTE AND VENT PIPING, ETC.

PLUMBING APPROVED MANUFACTURER SCHEDULE

WATER CLOSETS & LAVATORIES	KOHLER	ZURN
	AMERICAN STANDARD	
MOP BASINS	FIAT PRODUCTS	CRANE
	STERN WILLIAMS	
FLUSH VALVES	KOHLER	SLOAN
	AMERICAN STANDARD	MOEN
TOILET SEATS	BEMIS	KOHLER
	CHURCH	AMERICAN STANDARD
CARRIERS OR SUPPORTS	ZURN	JOSAM
	WATTS	SMITH
LAVATORY FAUCETS	MOEN	KOHLER
	AMERICAN STANDARD	SLOAN
MISCELLANEOUS TRIM (TRAPS, SUPPLIES, STRAINERS)	DEARBORN	McGUIRE
	BRASS CRAFT	ROYAL BRASS
DRAIN AND SUPPLIES INSULATION KITS	MCGUIRE	
HOSE BIBBS	DEARBORN	McGUIRE
	BRASS CRAFT	ROYAL BRASS
DRINKING FOUNTAINS	ELKAY	HALSEY TAYLOR
	HAWS	FILTRINE
FLOOR DRAINS, FLOOR CLEANOUTS, WALL CLEANOUTS, AND OUTSIDE CLEANOUTS	ZURN	JOSAM
	WATTS	SMITH

PLUMBING FIXTURE SCHEDULE

	TYPE MARK	MANUFACTURER	MODEL	ADA COMPLIANT	DESCRIPTION	ACCESSORIES	COUNT
*	WC-1	American Standard	3351.001 (1.28)	Yes	Wall hung rear outlet white vitreous china siphon jet water closet with elongated bowl, 1-1/2" top spud, 2-1/8" passageway, antimicrobial surface. Operates in the range of 1.1 - 1.6 gpf. Exposed flushometer, 1.28 gpf, vandal resistant control stop, vacuum breaker and self cleaning filter. ADA/TAS compliant installation for Adults . Top of seat 17" - 19". Flush valve handle on wide side.	FLUSH VALVE - Sloan Royal 111-1.28./CARRIER - Watts ISCA-101-L/R adjusted for 17" bowl height./SEAT - Bemis 1655-SS/C white solid plastic open front./	13
*	WC-2	American Standard	3351.001 (1.28)	No	Wall hung rear outlet white vitreous china siphon jet water closet with elongated bowl, 1-1/2" top spud, 2-1/8" passageway, antimicrobial surface. Operates in the range of 1.1 - 1.6 gpf. Exposed flushometer, 1.28 gpf, vandal resistant control stop, vacuum breaker and self cleaning filter. Top of seat 16" - 17".	FLUSH VALVE - Sloan Royal 111-1.28./CARRIER - Watts ISCA-101-L/R adjusted for 17" bowl height./SEAT - Bemis 1655-SS/C white solid plastic open front./	44
	WC-3	American Standard	2467.016	Yes	Elongated, 16-1/2", HIGH 'Pressure-Assist Low Consumption' Two Piece Tank Toilet, floor mounted, vitreous china with 'EverClean' antimicrobial surface which inhibits the growth of stain and odor causing bacteria, mold and mildew, elongated syphon jet flush action bowl, 2-1/8" fully glazed internal trapway, 10" x 12" large water surface, "Speed Connect" P.A. tank complete, 1.6 GPF per flush, with cast sanitary guard on bowl for china to china tank assembly, bolt caps. Provide stainless steel water closet flange.	FLUSH VALVE - Pressure-assisted siphon jet/SUPPLIES & STOPS - McGuire LFBV2-10./SEAT - Bemis 1655-SS/C white solid plastic open front./	1
	LAV-1	American Standard	9024.004EC	Yes	21-1/4 "x 20 -1/2 ", wall mount white vitreous china lavatory, center hole, overflow, ADA compliant, drilled for concealed arm carrier. Above deck faucet, chrome plated finish, vandal resistant aerator, security pin to not allow spinning, and in-line filters. Install top of rim height 34" above finished floor to comply with Adult ADA/TAS requirements. Provide Truebro Lav Guard 2. Provide new fixture wall carrier. Modification to existing walls may be required to allow installation of wall carrier.	FAUCET - Moen 8894./SUPPLIES & STOPS - McGuire LFBV2-09./CARRIER - Zurn Z1251./DRAIN/TRAP - McGuire PW2125HDWC./	22
	LAV-2	American Standard	9024.004EC	No	21-1/4 "x 20 -1/2 ", wall mount white vitreous china lavatory, center hole, overflow, ADA compliant, drilled for concealed arm carrier. Above deck faucet, chrome plated finish, vandal resistant aerator, security pin to not allow spinning, and in-line filters. Install top of rim height 34" above finished floor or as directed by the Architectural drawings. Provide Truebro Lav Guard 2. Provide new fixture wall carrier. Modification to existing walls may be required to allow installation of wall carrier.	FAUCET - Moen 8894./SUPPLIES & STOPS - McGuire LFBV2-09./CARRIER - Zurn Z1251./DRAIN/TRAP - McGuire PW2125HDWC./	19
	DF-1	ELKAY	EDFP217C	Yes	Bi-Level Vandal Resistant Fountain, Non-Filtered Non-Refrigerated, Stainless Steel. Furnished with Vandal Resistant bubbler. Mechanical Front Bubbler Button activation. Product shall be Wall Mount (On Wall), for Indoor + Outdoor applications, serving 2 station(s). P-traps located below fixture.	SUPPLIES & STOPS - McGuire LFBV2-09./	8
	MB-1	Fiat Products	MSB3624	No	The MSB 3624 shall have overall outside dimensions of 36" x 24" x 10". The molding shall be done in matched metal dies under heat and pressure resulting in a one-piece homogeneous product. The unit shall have 10" high walls with not less than 1" wide shoulders and an integrally molded shelf 10 9./16" wide where indicated.	FAUCET - Fiat 832-AA./HOSE AND BRACKET - Fiat 832-AA./MOP HANGER - Fiat 889-CC./WALL GUARD - Fiat MSG-3624./BUMPER - Fiat E77AA36./	2
	HB-1	Chicago	293-CP	No	Interior hose bibb, 1/2" inlet, 3/4" hose thread outlet, polished C.P. finish, with chrome plated back siphonage backflow preventer, slow compression cartridge, loose key handle.	BACKFLOW PREVENTER - Chicago Model E27JKCP./	15
	HB-2	Woodford Manufacturing Company	Model 68	No	Wall hydrant shall be Woodford ASSE 1053 listed Model 68, automatic drainage. Replaceable 16 gauge stainless steel cover, high flow double backflow preventer.	BACKFLOW PREVENTER - Woodford 50HA-CH./	16
	WHA-1A	WATTS	LF15M2-AS	No	Lead free water hammer arrestor. A, B or C designates PDI sizing for arrestor. Locate above ceiling line. For area with non-accessible ceilings, provide access panel.		2
	WHA-1C	WATTS	LF15M2-CS	No	Lead free water hammer arrestor. A, B or C designates PDI sizing for arrestor. Locate above ceiling line. For area with non-accessible ceilings, provide access panel.		7
	FD-1	WATTS	FD-103-M6	No	Finished Area Floor Drain with Square Strainer. Epoxy coated cast iron body floor drain, square nickel bronze adjustable strainer, I.C., clamping collar, vandal proof Torx head screws, deep seal p-trap and Trap Guard insert.		1
	FD-2	WATTS	FD-103-A5	No	Finished Area Floor Drain with Round Strainer. Epoxy coated cast iron body floor drain, round nickel bronze adjustable strainer, I.C., clamping collar, vandal proof Torx head screws, deep seal p-trap and Trap Guard insert.		11
	FD-3	WATTS	FD-103-A6	No	Finished Area Floor Drain with Round Strainer. Epoxy coated cast iron body floor drain, round nickel bronze adjustable strainer, I.C., clamping collar, vandal proof Torx head screws, deep seal p-trap, Trap Guard insert and 1" high oval funnel.	FUNNEL - Josam F8./	2
	WCO-1	WATTS	CO-480-RD	No	Plug and polished stainless steel round access coverplate secured to plug by stainless steel countersunk screw. Provide countersunk threaded brass plug, where required, in lieu of raised head plug. Provide necessary tapped tees, tapped crosses or ferrules, and other fittings required to install coverplate against finished wall.		15
	FCO-1	WATTS	CO-203-R	No	Floor Cleanout with Round Top, epoxy coated cast iron floor cleanout, nickel bronze adjustable strainer, removable gas tight gasketed brass cleanout plug and vandal proof Torx head screws.		4
	OCO-1	WATTS	CO-300-MF	No	Watts Drainage Products CO-300-MF epoxy coated cast iron access housing with anchor flanges and extra heavy duty ductile iron cover.		22
	E-UR	Existing	Existing		Existing wall mount Urinal to be reinstalled, provide new fixture flange and re-caulk. Provide new exposed flushometer with vacuum breaker. Install top of rim of basin 17" A.F.F. for fixture that is to comply with adult ADA/TAS requirements, refer to Architectural drawings for fixture heights. Non-ADA fixtures to be mounted back at original height.	FLUSH VALVE - Royal 186-0.5./	20

Grand total: 224

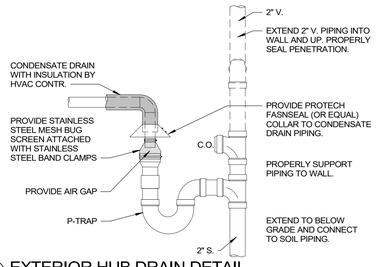
* Due to limited chase space, standard water closet carriers to be utilized in lieu of heavy duty.

PLUMBING EQUIPMENT SCHEDULE

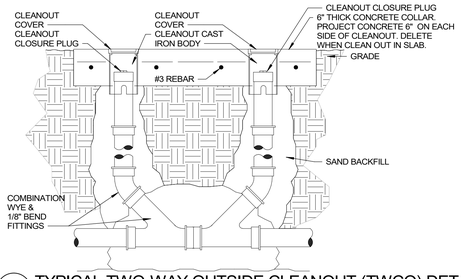
Type Mark	Manufacturer	Model	Actual Total Power	Voltage	Phase	Capacity	Pump HP	Description	Count
EWH-1	Rheem	EGSP15	3000 W	208 V	1	15.0 gal		Water heater, 4,500 watt heating element, 20 gallon storage, 208 volt, single phase, 12 gallon per hour recovery based on 100 degrees F. rise in water temperature, AGA/ASME rated temperature and pressure relief valve, tank coated with a high temperature porcelain enamel, magnesium anodes, tank working pressure of 150 PSI, polyurethane foam insulation, manual reset, high limit control, and copper low watt density, resistored, screw-in type thermostats, five (5) year limited warranty against tank leaks, and HoldRite galvanized water heater wall mount support model #40-SWHP-W.	2
SP-1	Liberty Pumps, Inc.	ELV-290		120 V	1		552 W	Furnish and install submersible elevator sump pump and accessories where indicated on the drawings. Assembly shall consist of a sump pump, piping, valves, power and control wiring (wiring shall meet NEC requirements), receptacles, OilTector control panel and remote alarm.	1

PLUMBING FIXTURE BRANCH PIPE SIZE SCHEDULE

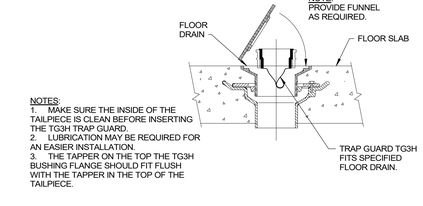
DESCRIPTION	SOIL/WASTE	VENT	COLD WATER	HOT WATER
WATER CLOSET	4"	2", 4"	1"	-
URINAL	2"	1 1/2"	3/4"	-
LAVATORY	2"	1 1/2"	1/2"	1/2"
MOP BASIN	3"	2"	3/4"	3/4"
ELECTRIC WATER COOLER	2"	1 1/2"	1/2"	-



4 EXTERIOR HUB DRAIN DETAIL
NO SCALE



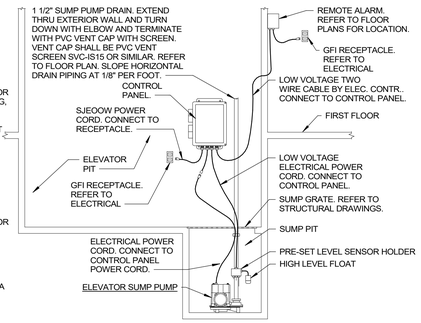
5 TYPICAL TWO-WAY OUTSIDE CLEANOUT (TWCO) DETAIL
N.T.S.



NOTE:
PROVIDE FUNNEL AS REQUIRED.

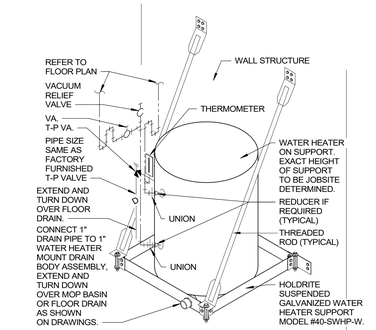
NOTES:
1. MAKE SURE THE INSIDE OF THE TAILPIECE IS CLEAN BEFORE INSERTING THE TG3H TRAP GUARD.
2. LUBRICATION MAY BE REQUIRED FOR AN EASIER INSTALLATION.
3. THE TAPPER ON THE TOP THE TG3H BUSHING FLANGE SHOULD FIT FLUSH WITH THE TAPPER IN THE TOP OF THE TAILPIECE.

1 TYPICAL FLOOR DRAIN (FD) DETAIL
N.T.S.

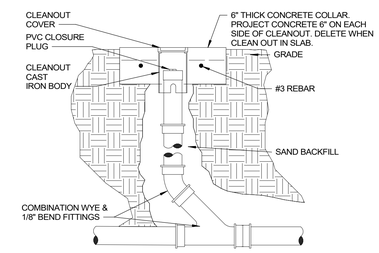


NOTES:
1. SET DETECTION LEVELS PER MANUFACTURERS RECOMMENDATIONS.
2. SUMP PUMP SHALL BE DESIGNED AND APPROVED FOR SAFE OPERATION OF PUMPING, ALARMING AND MONITORING OF ELEVATOR SUMP PITS WHERE OIL AND WATER MUST BE DETECTED. THE OIL DETECTOR SYSTEM WILL ACTIVATE THE PUMP TO REMOVE WATER FROM ELEVATOR PITS IN ACCORDANCE WITH ASME A17.1, AND WILL PROVIDE PUMPING OF ONLY WATER - EVEN IF AN OIL CONDITION IS DETECTED. THE OIL DETECTOR CYCLES THE PUMP ONLY IN THE WATER RANGE. OIL AND OTHER HARMFUL FLOATING SUBSTANCES ARE NOT DISCHARGED INTO THE ENVIRONMENT. AN ALARM IS ACTIVATED IN THE EVENT OF A HIGH WATER CONDITION OR HIGH OIL CONDITION.

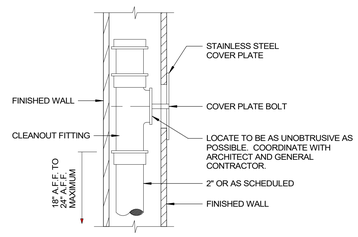
2 ELEVATOR SUMP PUMP (SP) DETAIL
1/8" = 1'-0"



3 WALL HUNG WATER HEATER (EWH) DETAIL
N.T.S.



6 TYPICAL OUTSIDE CLEANOUT (OCO) DETAIL
N.T.S.



7 TYPICAL WALL CLEANOUT (WCO) DETAIL
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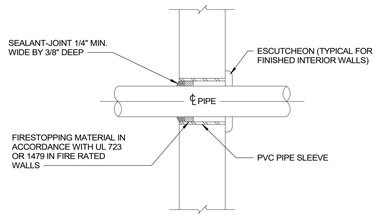
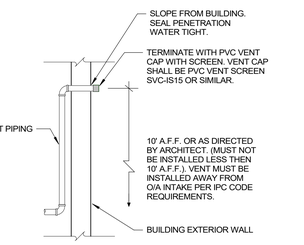
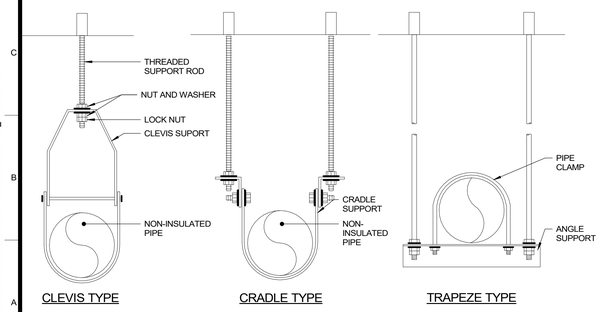


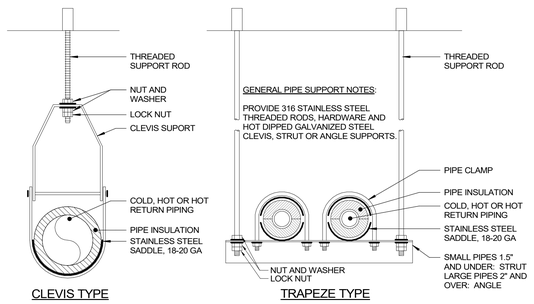
8 TYPICAL PIPE PENETRATION THRU WALL DETAIL
N.T.S.



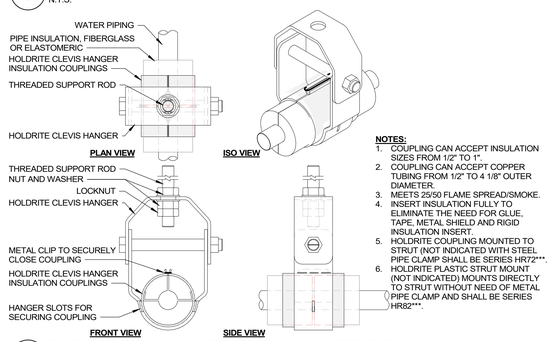
9 TYPICAL VENT THRU WALL DETAIL
N.T.S.



10 DETAIL - CLEVIS PIPE SUPPORT (NON-INSULATED PIPING)
1/2" = 1'-0"

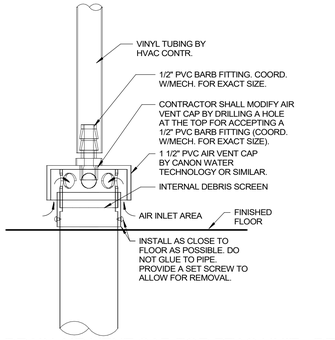


11 DETAIL - CLEVIS PIPE SUPPORT (INSULATED PIPING)
N.T.S.



NOTES:
1. COUPLING CAN ACCEPT INSULATION SIZES FROM 1/2" TO 1".
2. COUPLING CAN ACCEPT COPPER TUBING FROM 1/2" TO 4 1/8" OUTER DIAMETER.
3. MEETS 25/50 FLAME SPREAD/SMOKE.
4. INSERT INSULATION FULLY TO ELIMINATE THE NEED FOR GLUE, TAPE, METAL SHIELD AND RIGID INSULATION INSERT.
5. HOLDRITE COUPLING MOUNTED TO STRUT (NOT INDICATED WITH STEEL PIPE CLAMP SHALL BE SERIES HR72***.
6. HOLDRITE PLASTIC STRUT MOUNT (NOT INDICATED) MOUNTS DIRECTLY TO STRUT WITHOUT NEED OF METAL PIPE CLAMP AND SHALL BE SERIES HR82***.

12 TYPICAL PIPE HANGER FOR INSULATED PIPE
6" = 1'-0"



13 HUB DRAIN AIR VENT CAP FOR PTAC UNIT - DETAIL
N.T.S.

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STATE OF TEXAS — R. DAVID MORALES — 108769 — LICENSED CIVIL ENGINEER — 11/11/2025

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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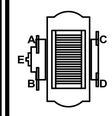
1092-0325

KEY PLAN (NTS)



PLAN NORTH — TRUE NORTH

SHEET NAME
PLUMBING SCHEDULES AND DETAILS

SHEET NUMBER
P2.1

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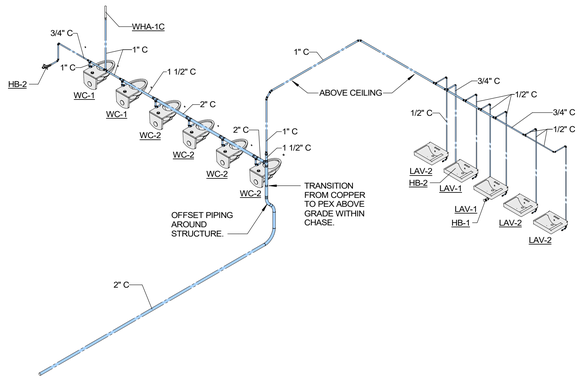

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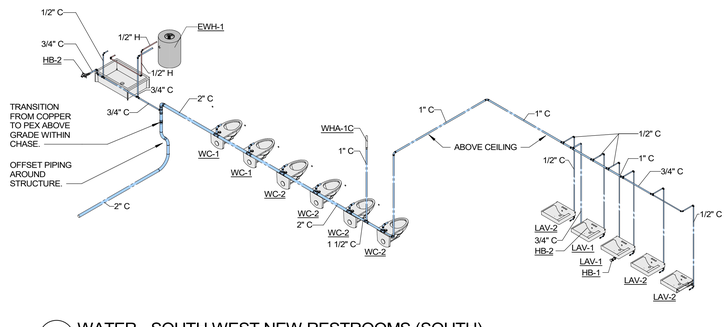

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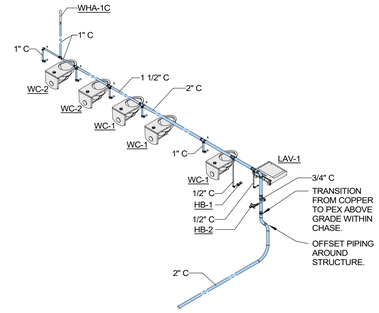

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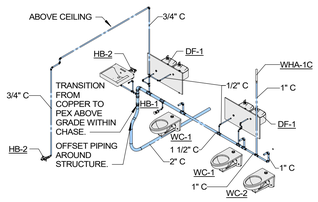

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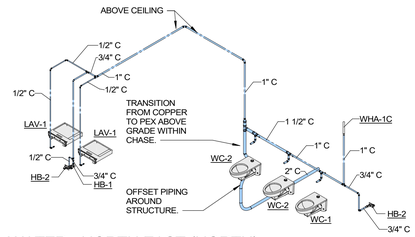

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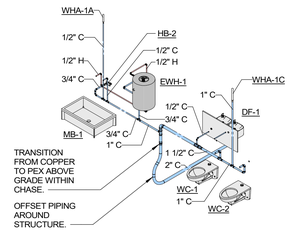

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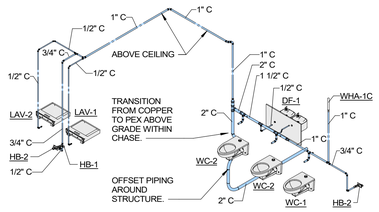

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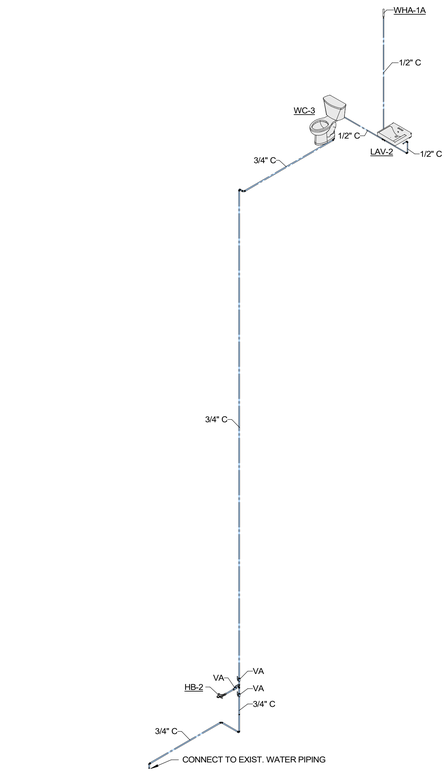

8 SCHEMATICS - WATER - PRESS BOX

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HIGH SCHOOL STADIUM IMPROVEMENTS - TWO

CALALLEN INDEPENDENT SCHOOL DISTRICT

4001 WILDCAT DRIVE, CORPUS CHRISTI, TX 78410

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DATE ISSUED:
11/11/2025

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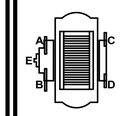
1092-0325

KEY PLAN (NTS)



PLAN NORTH
TRUE NORTH

SHEET NAME
PLUMBING SCHEMATICS

SHEET NUMBER
P3.1

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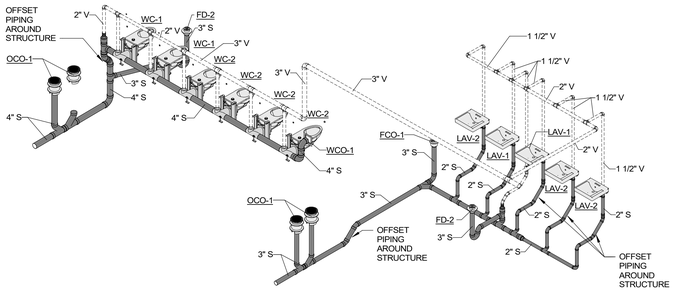

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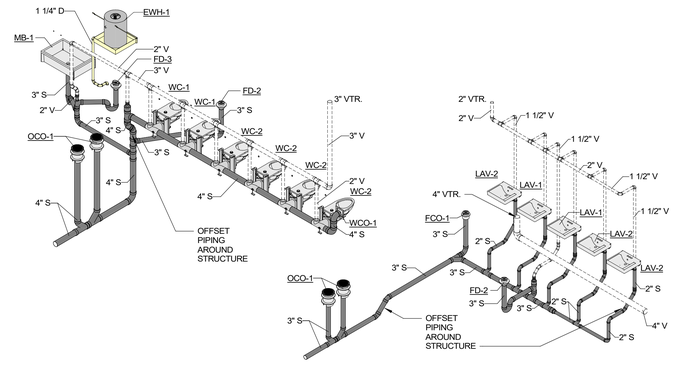

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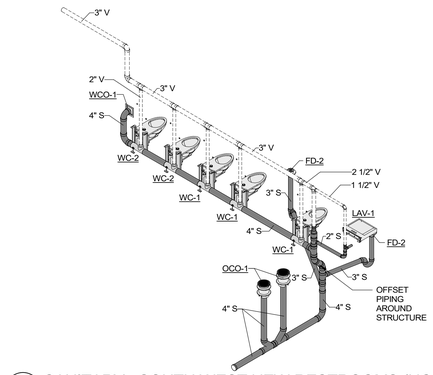

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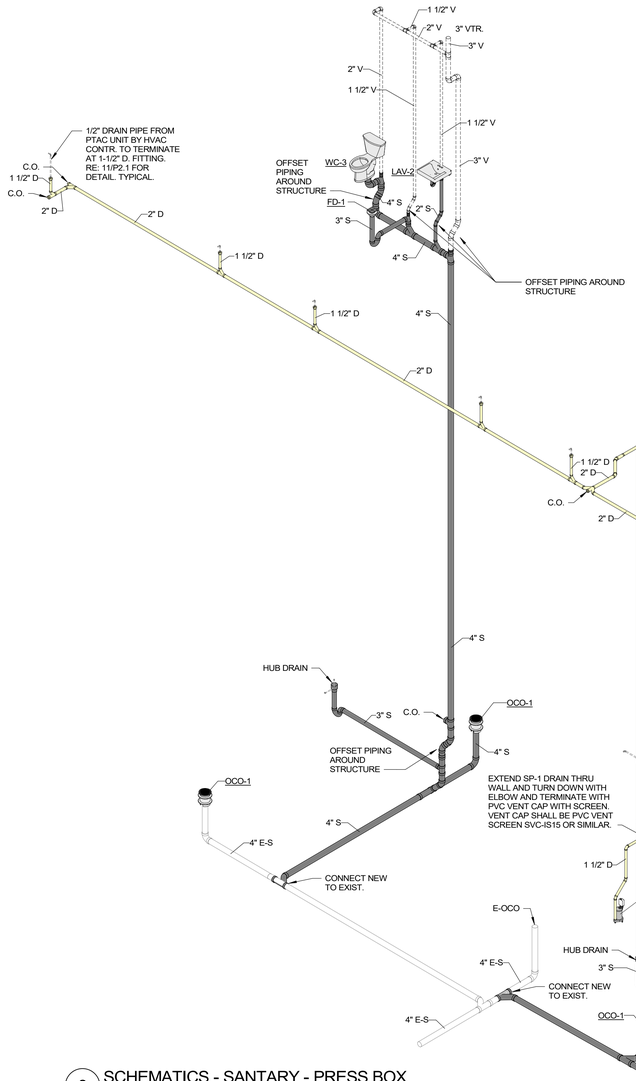

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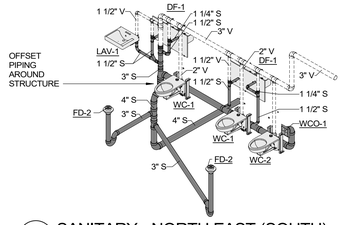

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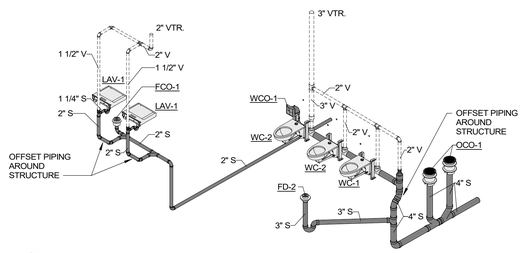

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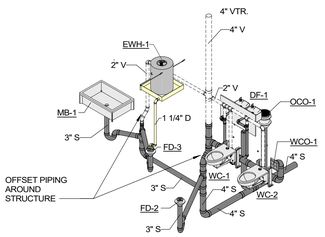

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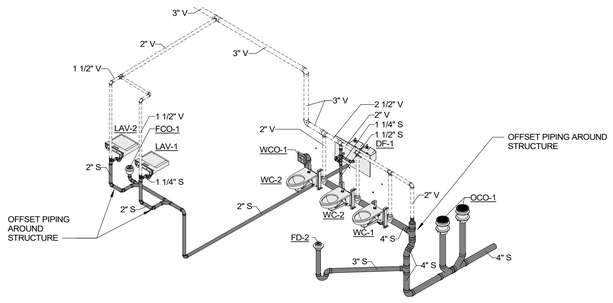

7 SANITARY - SOUTH EAST NEW RESTROOMS (NORTH)

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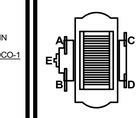

PLAN NORTH
TRUE NORTH

SHEET NAME
PLUMBING SCHEMATICS

SHEET NUMBER
P3.2

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